

Mood and Health Judgments: Does the Affect Infusion Model Hold?

by

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Abstract

This thesis reports an investigation into the applicability of Forgas's (1992a, 1992c, 1994a, 1995b) Affect Infusion Model (AIM) to health judgments made by healthy people. According to the AIM, the extent of mood influence on judgments depends on the information processing strategy used and the length of processing time. Findings of mood-congruence for some health judgments (Salovey & Birnbaum, 1989) suggested that complex stimuli requiring elaborate processing could be expected to be particularly influenced by mood and hence result in mood-congruent judgments (Forgas, 1994a).

A preliminary experiment established suitable audiovisual and autobiographical methods of inducing happy, neutral and sad moods. A programme of seven experiments was conducted which tested the AIM, and more particularly tested the hypothesis that people in an induced sad mood would take longer to process information and make more pessimistic judgments than people in an induced happy mood.

In three experiments, happy or sad (and in two of these experiments neutral) moods were induced and health judgments made. The findings lacked consistency with the AIM. Possible methodological issues were examined and ruled out as explanations for lack of affect infusion.

A replication of Salovey and Birnbaum's (1989) Experiment 3 on health judgments was run with the addition of the health items developed for the experiments reported in this thesis. There was partial confirmation of Salovey and Birnbaum's findings of reduced optimistic bias for people in a sad mood making judgments of negative health events. A final experiment involved the breaking down of the items of this study into four sub-types to establish under what circumstances affect infused judgments. Processing times were assessed separately for negative and positive items, enabling testing of the processing time aspect of the AIM, in relation to Salovey and Birnbaum's finding of

mood effects with negative health judgments. Results again provided partial confirmation of Salovey and Birnbaum's mood-congruence findings. However, even when mood congruence was demonstrated, this was not associated with differences in processing time as predicted by the AIM, either for Salovey and Birnbaum's items or for those developed for this series of experiments.

The lack of finding of an association between processing time and mood congruence, when it occurred, indicates difficulties for the AIM. The predictions of the model do not apply in a straightforward way to health judgments made by healthy people. It is suggested that an optimistic bias might sometimes result in motivated processing reducing the likelihood of mood effects in health judgments. An examination of Forgas's model in relation to the Interacting Cognitive Subsystems model (Barnard & Teasdale, 1991) is proposed as an area for further research.

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Table of Contents

Chapter 1:	Introduction	1
Chapter 2:	Affect and Cognition.....	4
Chapter 3:	Forgas's Affect Infusion Model for Social Judgments	29
Chapter 4:	Health Judgments	49
Chapter 5:	Rationale for Experimentation and Research Aims	65
Chapter 6:	Experiment 1: A Comparison of some Non-verbal Methods of Inducing Mood, with Each Other and with an Autobiographical Method.	69
	Hypotheses	71
	Method	72
	Results	75
	Discussion	78
Chapter 7:	Experiments 2, 3 and 4: Mood Influence on Health Judgments	80
	Hypotheses for Experiments 2, 3 and 4	82
	Experiment 2: Audiovisual Mood Induction and Computer- administered Items	83
	Method	83
	Results and Discussion.....	85
	Experiment 3: Autobiographical Mood Induction and Computer- administered Items	99
	Method	99
	Results and Discussion.....	100
	Experiment 4: Audiovisual Mood Induction and Pencil-and-paper- presented Items.	111
	Method	111
	Results and Discussion.....	112
	General Discussion of Findings of Experiments 2, 3 and 4	127

Chapter 8:	Experiments 5 and 6: Two Procedural Issues	132
	Experiment 5: The Direction of the Scales	133
	Method	133
	Results and Discussion.....	136
	Experiment 6: Comparing the Depth of Processing between the Two Item Types.	139
	Method	140
	Results and Discussion.....	141
	Summary of Findings of Experiments 5 and 6.	144
Chapter 9:	Experiment 7: Mood Influence on Judgments of the Salovey and Birnbau Type and of the Type used in this Thesis.....	145
	Hypotheses	147
	Method	147
	Results and Discussion.....	151
	Summary and Conclusions.....	173
Chapter 10:	Experiment 8: Mood Influence on Positive and Negative Health Events, Varying Item Type and Item Target.....	175
	Hypotheses	179
	Method	180
	Results and Discussion.....	182
	Summary and Conclusions.....	199
Chapter 11:	Summary, Discussion, Implications and Conclusions	203
References	.....	225
Appendix A:	Protocols for Experiment 1	256
	A1: Experimental Design.....	257
	A2: Participant Consent Form.....	258
	A3: Participant Instructions	259
	A4.1: Need for Cognition (Social Cognition) Questionnaire	260
	A4.2: Need for Cognition Scale - Showing Reversed Items.....	262
	A5: Typical Visual Analogue Scale.....	263
	A6: Scripts for Autobiographical Mood Inductions.	264

Appendix B: Protocols for Experiments 2, 3 and 4 266

 B1: Participant Consent Form..... 267

 B2: Questionnaire - Pencil & Paper Format 268

 B3: Scoring Schema for Self Esteem Questionnaire 285

 B4: Post Experimental Awareness Questionnaire 286

Appendix C: Protocols for Experiment 5 287

 C1: Participant Consent Form..... 288

 C2: Questionnaire Booklet ““Very likely” First’ Version 289

 C3: Questionnaire Booklet ““Very unlikely” First’ Version 298

Appendix D: Protocols for Experiment 6 300

 D1: Participant Consent Form..... 301

 D2: Questionnaire Booklet 302

Appendix E: Protocols for Experiment 7 329

 E1: Participant Consent Form..... 330

 E2: Health Inventory 331

 E3: Scripts for Autobiographical Mood Inductions. 333

 E4: Questionnaire Booklet..... 334

Appendix F: Protocols for Experiment 8 352

 F1: Questionnaire Booklets 353

Chapter 1

Introduction

Chapter 1

Tell me where is fancy bred ... in the heart or in the head?

The Merchant of Venice III.ii.63

Introduction

“In a sense we have two brains, two minds - and two different kinds of intelligence: rational and emotional. How we do in life is determined by both - it is not just IQ, but *emotional* intelligence that matters. Indeed, intellect cannot work at its best without emotional intelligence. Ordinarily the complementarity of limbic system and neocortex, amygdala and prefrontal lobes, means each is a full partner in mental life. When these partners interact well, emotional intelligence rises as does intellectual ability.” (Goleman, 1996, p. 28). Despite the traditional view of mind as comprising affect as well as cognition and conation, affect has only recently assumed a prominence in the discipline of psychology (Fiedler & Forgas, 1988; Hilgard, 1980; Watson & Tellegen, 1985).

This thesis explores of an aspect of the relationship between emotion and cognition. In particular, the influence of mood on health judgments is examined in the context of Forgas’s (1992a, 1992c, 1994a, 1995b) Affect Infusion Model (AIM) for social judgments. Chapter 2 assesses definitional issues and examines the historical and theoretical contexts for a study of affective influence on cognition. It is concluded that although it is generally accepted that affect influences cognition, the mechanisms for such influence have lacked a consistent and empirically substantiated theoretical framework. Chapter 3 examines one possible framework, the AIM (Forgas, 1992a, 1992c, 1994a, 1995b) which describes four possible strategies for the making of social judgments. According to the AIM, judgments resulting from strategies involving more detailed processing are more subject to affective influence than those involving less

processing. Chapter 4 examines research findings about health judgments and assesses health judgment findings in relation to the AIM. A summary of Chapters 2, 3 and 4 is presented in Chapter 5, followed by the rationale for the ensuing research. The eight experiments comprising the experimental program are presented, appropriately grouped, in Chapters 6, 7, 8, 9 and 10. The findings reported in Chapter 6 were presented at conferences as Dobber and Ball (1995a) and those of Chapter 7, as they accumulated, as Dobber and Ball (1995b; 1996). In Chapter 11, the results are summarised, and the implications of the findings for health judgments and for the applicability of Forgas's AIM to health judgments are discussed.

Chapter 2

Affect and Cognition

Chapter 2

Affect and Cognition

Historical context

The “two minds, the emotional and the rational, operate in tight harmony for the most part, intertwining their very different ways of knowing to guide us through the world” (Goleman, 1996 pp. 8, 9). This ancient perceived dichotomy between the emotional and the rational, was mirrored in folk psychology by a distinction between the heart and the head. The heart/head contrast has also been related to a subjective/objective dichotomy (Parrott, 1995). In the context of scientific enquiry, emotions have usually been ignored, or, where they have been given any status, have been labelled for the purpose of controlling them (Oatley and Jenkins, 1992). However, in the latter part of this century, emotion has assumed a greater prominence, with, for example, Watson and Tellegen (1985, p. 219) indicating that “psychology has rediscovered affect” and O’Rourke and Ortony (1994), with their calculus theory of emotion, acknowledging that emotions and cognitions are inextricably intertwined. A prerequisite for the study of affective influences on cognition was a recognition of their importance. Such a recognition has been followed by a series of struggles to interpret and reconcile conflicting data obtained from such studies.

Another traditional view of the mind involved not only the heart and the head, but also a third component. Such a triad of affect (feeling), cognition (thinking) and conation (motivation and behaviour), indicates that cognitive psychology had not been viewed as entire unto itself (Hilgard, 1980). However affect, cognition and conation were dealt with mainly in isolation, with affect often neglected (Fiedler & Forgas, 1988). Zajonc (1980) noted that to define feeling and thinking was almost to embrace a dualist philosophy. Such a substratum might provide reason for the historical hesitation to recognise affective influence on cognition.

Neither the behaviourist paradigms (Skinner, 1953; Watson, 1913), nor the cognitivist paradigms (e.g. Neisser, 1967) incorporated affective processes. The behaviourists saw such processes as internal and therefore irrelevant, and the cognitivists saw them as disruptive to normal cognition (Forgas, 1994a). More recently the effects of the emotions were perhaps neglected because the computer – as a model of the brain – provided no convenient analogue (Eagly & Chaiken, 1993).

However the “New Look” approach to the study of perception which became influential in the middle of the twentieth century (Bruner, 1957; Bruner & Postman, 1947a, 1947b; Bruner & Tajfel, 1961; Erdelyi, 1974; McGinnies, 1949; Pettigrew, 1958; Prentice, 1961; Schachter and Singer, 1962; Tajfel, 1957) emphasised the roles of emotion and motivation and later Zajonc (1980) argued for more attention to affective phenomena in social psychology. Rather than assuming affect to be post-cognitive as did James (1890), Zajonc (1980) appealed to Wundt’s notion of the temporal primacy of affect: “the clear apperception of ideas in acts of cognition and recognition is always preceded by feelings” (Wundt, 1907, pp. 243-244). Zajonc (1980) related affective reactions to faster and more primitive organismic responses, and, conversely, cognitive reactions to higher, slower functions. Zajonc (1968) had found that participants’ ratings of more frequently presented test stimuli were more positive than ratings of less frequently presented ones. That is, greater exposure to particular stimuli was enough to make them preferred. Moreland and Zajonc (1977, 1979) and Innes (1977) studied the role of stimulus recognition in what has been termed the *mere exposure* phenomenon (because mere exposure was enough to make one stimulus preferred over another). This was supported later by a meta-analysis of research over 1968-1987 by Bornstein (1989), although the underlying mechanism for the phenomenon was not clear (Axelson & Brinberg, 1989). The findings of Moreland and Zajonc (1977) indicated that stimulus recognition is not a necessary condition for the *mere exposure* effect, suggesting the occurrence of pre-attentive processing. Social settings provide a way in which

emotional and cognitive inter-relationships can be studied, without the reductionist tendencies of cognitive information processing paradigms (Fiedler & Forgas, 1988).

Contemporary psychologists (for example Greenwald, 1992; Kihlstrom, Barnardt & Tataryn, 1992; Kitayama, 1990) have recently revisited the “New Look”, investigating pre-attentive, unconscious or subliminal processing, and confirmed that cognitive processes include unattended, but nevertheless registered stimuli, including affectively laden stimuli.

Tetlock and Levi (1982) explored perspectives on the relationship between cognition and motivation (cf. Bradley, 1978; Heider, 1958) in social psychology in the context of attribution bias, and noted the reluctance of psychologists to acknowledge motivational and affective influences in the making of judgments. They indicated that motives can influence an individual’s attention at various stages of information processing, at reception, retrieval and integration, as well as at response (c.f. Erdelyi, 1974). They drew attention to the limitations imposed by a purely cognitive account of the making of judgments. People were not to be seen as “intuitive scientists” (Kelley, 1967), merely collecting and analysing information. Their preferences were also subject to emotional influence. Tajfel’s (1978) theory of social identity, later developed with Turner (Tajfel & Turner, 1986), incorporated a motivational aspect, whereas much of the preceding empirical research on intergroup relations had been in cognitive terms.

Affect, attitude and motivation, as constructs, all involve two aspects: how the world is and how it might be, as well as a combination of those aspects. That is, affect, attitude and motivation all involve positive and negative judgments by people in response to both their external (outside the person) and internal (inside the person) environments. In this way motivation and affect are distinct from cognitive dimensions.

How are affect and cognition defined?

Cognitions, according to the philosopher, Flew (1979), are mental processes connected with understanding, formulation of beliefs, and knowledge acquisition. Feelings, emotions, mood, “affections” and “passions” have been less clearly defined, and viewed as aspects of motivation. “Cognition is a generic term used to designate all processes involved in knowing” (Hilgard, 1980, p. 6). Affect was a term used in association with a person’s “mental disposition”, as “desire, passion”, and, in contradistinction to the intellect, as “opposite to reason” (Little, Fowler, Coulson, Onions & Friedrichsen, 1973). Isen (1984), noting the difficulties in defining affect, proposed that definitions might be clarified through further experimental study of affect. However, this has inherent difficulties as researchers need to have defined the object of their study in order to plan and implement research. As well as noting the difficulties involved in defining affect, Isen also acknowledged the difficulty of defining emotions, feelings and moods. In fact, different researchers use slightly different definitions, with these sometimes differing in their turn from common usage.

Sometimes affect has been defined in cognitive terms. For example, Tucker (1981) defined two sorts of cognition. He described syncretic cognition as holistic, synthetic and affective, and analytic cognition as sequential, logical and reason-oriented. Laird (1991) also subsumed affect under a cognitive mantle, proposing that cognition is knowledge about the outside world and affect is cognition – knowledge or perception – about the self. He indicated that when researchers run experiments on emotion, they emphasise feelings, whereas these are but one aspect of several constituents of emotion. According to Laird, an emotional event actually comprises at least six components: an eliciting event, event appraisal, autonomic response patterns, expressive behaviour, instrumental action and feeling. Any of these could mediate cognitive effects. However experimenters often ask participants to report only their feelings.

Branscombe (1988) defined cognition in terms of the internal processes involved in acquiring, storing, transforming and retrieving information, with associated theoretical issues being how information is represented in memory and what processes operate on these mental representations. Definitions of emotion usually refer to its precursors and such definitions are complicated by the fact that quite similar precursors may appear to elicit quite different emotions. Any satisfactory theory of emotion needs to explain how individuals respond differently in the same context (Branscombe, 1988).

From a sociocultural perspective, Armon-Jones (1985) proposed that emotions are responses to environmental occurrences which are presented through “specific modes of social organisation, normative expectations, beliefs and values”. Emotions were to be understood, not as natural and passive states, but rather as “socially determined patterns of ritual action”. Emotions could be viewed as socially constructed experiences: only some of the emotions experienced by children are validated by adults and peers (Armon-Jones, 1985) and hence the emotions shown in a community are shaped by that community. Scherer (1996) defined emotion as a hypothetical and multiple construct comprising feeling, action tendency, and cognitive content, serving the purposes of social signalling, behavioural flexibility, processing of information between stimulus and response, and the regulation and control of experience.

Mayer and Salovey (1988, p. 88) defined affect somewhat differently, as a “generic process that might be emotional or due to other physiological processes such as the variation between sleep and wakefulness”. *Mood* was seen to be more specific, referring to “a feeling state (e.g., angry, happy, sad) that involves multiple psychological subsystems including the hormonal, facial expressive, postural, and cognitive systems”, with *emotions* referring to short term moods. Forgas (1994a), however, used the term *affect* as an overarching term for two separate categories, mood and emotion, with moods being low intensity, diffuse, relatively enduring affective

states with no salient antecedent cause and with little cognitive content, and emotions being more intense, short-lived, with a salient cause and with clear cognitive content.

Salovey and Mayer (e.g. Mayer & Geher, 1996; Mayer & Salovey, 1993; Mayer & Salovey, 1995, Salovey & Birnbaum, 1989; Salovey & Mayer, 1990) integrated emotion and cognition as concepts by developing the notion of emotional intelligence (Salovey & Mayer, 1990) whereby arousal of mood and emotions would result in changes in attentional focus and memory retrieval. This would enable explicit awareness of one's own moods, management of emotions, self-motivation, recognition of emotion in others and handling of relationships (Goleman, 1996; Salovey & Mayer, 1990).

Are affect and cognition separable from other constructs?

As well as debate as to whether affect and cognition are separate from each other, there is discussion as to whether they are constructs distinct from yet other constructs. For example Fiedler and Stroehm (1986) found an increased level of arousal in subjects in response to self-relevant material. Such a phenomenon would be explicable in terms of (i) Laird's (1991) view that feelings are cognitions which pertain to a person's self-concept and also with (ii) Riskind's (1989) view that mood induction involves cognitive priming which increases retrieval of data consistent with self-cognitions. Arousal level may be interpreted by the individual as emotion. In particular, self-referent information has been found to have unique perceptual and social effects (Markus & Smith, 1981). Self-referent information has also been found to be emotion-laden (Zajonc, 1980), and to be able to provoke automatic attention responses (Bargh, 1982). Some models of mood and cognition, for example that of Barnard & Teasdale (1991), take such effects into account. Izard (1993) also emphasised individual differences in her discussion of the role of emotions in evolution and adaptation. She proposed a hierarchical model with four types of emotional activating systems, three involving non-cognitive information processing (neural, sensorimotor and motivational) and one involving

cognitive processing. According to her model, each level operates continuously and interacts in providing the background emotionality characteristic of an individual, activating particular emotions in response to change.

Affect and cognition in relation to attitudes and judgments

Issues relating to affect and cognition are important in understanding the formation and modification of attitudes and the making of judgments. “An attitude is a mental and neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related” (Allport, 1935, quoted in Allport, 1968, p. 68). The nature of attitude, and attitude change, has been well summarised by writers such as Allport (1935/68), McGuire (1969) and more recently by Eagly and Chaiken (1993), Olson and Zanna (1993) and Ostrom, Skowronski and Nowak (1994). Attitudes are fundamental to judgments and also influence behaviour.

Whether attitudes and judgments result from affective or cognitive mechanisms or from both, has been the subject of debate. The lack of definition of emotion and cognition as distinct entities and particularly the question of whether they are separate or interacting systems, have been important issues. When people make a judgment, such a judgment is likely to be thought to lie at the cognitive end of a cognition-emotion axis, with the brain computing a response by some sort of statistical strategy, via for example cognitive algebra (Anderson, 1974, 1981, 1989). For example, judgments could be thought of as cognitive operations based on attention, learning, recall and associative processes (Wyer & Srull, 1989). However most judgments are made in a social context (cf. Eiser, 1991) and are likely to have emotional associations and consequences. It is unlikely that such judgments – social judgments – will be purely “cognitive”. Kaplan (1991) proposed that theoretical issues relating to choices between affective primacy, cognitive primacy, or affective/cognitive interaction models can be sidestepped by

adopting Schwarz and Clore's (1988) and Anderson's (1989) proposal that information about a target comes from both affective and cognitive sources.

In summary, historically, psychology has left affect in the wings while cognition took centre stage. Definitions of affect and cognition and descriptions of their relationship with other constructs have often been marked by lack of precision and consensus. The relationship between affect and cognition has been the subject of debate, with topics such as self-relevance, arousal level, attention and consequent inter- and intra-individual differences in processing being widely discussed.

Mood and judgments

The study of affective influence, on cognitive processes in general and on social judgments in particular, has been marked by attempts to reconcile the varied findings obtained. One of the most comprehensive models to reconcile findings relating to affective influences on social judgments has been Forgas's AIM (1992a, 1992c, 1994a, 1995b). This model, which is discussed in detail in the next chapter, proposes four processing categories to describe and predict affective influence on social judgments. These four processing categories are defined in terms of two aspects of the cognitive search (defined as the scanning through memory for specific facts or information, Reber, 1985). The first aspect is *search extent* which can be *partial* or *full*, and the second is *search strategy* which can be *closed* or *open*. Although other frameworks would be possible, these four resulting processing categories – direct access, motivated, heuristic, substantive – are adopted for reasons of convenience, continuity and consistency, as headings for the discussion which follows.

Direct access processing

The combination of a full search and a closed (directed) strategy yields what Forgas referred to as direct access processing, where judgments are made from direct access of stored material. As indicated by Forgas (1994a) this strategy has received little attention

in social judgment theory, although such judgments would arguably be common. Hence, empirical support for direct access processing as described in the AIM has often been deduced from experiments which had other objectives.

Motivated processing

In terms of the AIM, the combination of a partial search and a closed (directed) strategy yields motivated processing which is geared towards attaining or retaining a preferred mood (e.g. Forgas, 1994a). Some of the complexities of asymmetrical findings on mood influence in studies of negative and positive moods can be accounted for by motivated processing (Forgas, 1994a). The influence of negative affect appears to be more complex than that of positive affect, with negative states apparently triggering conflicting tendencies. Negative mood sometimes results in pessimism, but at other times in attempts to engage in positive thinking. Isen (1984) noted the consequent difficulty in predicting whether behaviour would be congruent with negative affect. She highlighted the paradoxical situation that some research findings indicated that negative feelings resulted variously in reduced, increased or unchanged helping behaviour. Isen (1984) proposed that such asymmetry is consistent with the self-regulatory models of Mischel (1973) and Bandura (1973, 1977) whereby people employ strategies likely to improve negative mood. Isen (1984) inferred that the influence of negative affect on cognitive processes might mediate the behavioural effects described, indicating that negative affect influences memory and judgment in more complex and less predictable ways than does positive affect.

Sedikides (1994) used mood repair to interpret his findings that judgments (self descriptions) were at first congruent with sad mood but that mood incongruence followed. He proposed that the mechanism of mood repair might account for inconsistency in findings of mood effects.

Heuristic processing

Whereas direct access and motivated processing involve focused searches and are not expected to be subject to mood influence, heuristic and substantive processing involve more open-ended search strategies and, according to the AIM, allow mood influence. These two strategies show mood influence and precisely because of this are the two which have most theoretical, and associated experimental, antecedents reported in the mood literature.

The AIM indicates heuristic processing to be likely when the target of the judgment is simple or typical, personal relevance is low, specific motivational goals are lacking, cognitive capacity is limited and the situation does not require accuracy and detailed processing. Forgas (1994a) suggested that in these circumstances affect is likely to be used as information (cf. Schwarz & Clore, 1988). This type of processing builds on the notion of humans as “cognitive misers”, a notion developed by Taylor (1981), positing that people minimise processing (Fiske & Taylor, 1991).

Such a processing strategy finds support in Isen’s (1984) summary of research findings for the influence of positive feelings, in that people who feel happier have ready access to positive material in memory and tend towards optimism in their expectations and behaviour. They also act to maintain their positive feeling states and solve problems by using simplifying strategies. Mackie and Worth (1989) explained their findings of processing deficits in people in a positive mood subjected to persuasive messages, by proposing that people in an induced positive mood might use less cognitive capacity than those in whom no mood had been induced. Mackie and Worth (1991) provided an explanation for the failure of positive moods consistently to result in increased persuasion: they proposed that positive mood, while apparently being associated with reduced attentional and processing capacities, might paradoxically also allow the possibility of greater flexibility and creativity.

Substantive processing

The AIM proposes that substantive processing is likely when the judgmental target is complex or atypical, cognitive capacity is adequate, there is no specific motivational goal, but the judge is motivated to be accurate, perhaps due to situational demands. Of the four proposed styles, substantive processing has received most attention, as it is that which is assumed usually to occur. The principal model underpinning this type of processing was provided by Bower (1981, 1991) as discussed below.

Some models for affective influence on cognitive processes

Various models have been put forward to account for affective influence on cognition. Forgas (1994a) described affect-as-information (Schwarz & Clore, 1988) as important in heuristic processing and the affect-priming associated with Bower's (1981, 1991) network theory as important in substantive processing. These models are discussed, followed by frameworks developed by Anderson (1983), Branscombe (1988), Fiedler (1990), Teasdale and Barnard (e.g. 1993), and Wyer and Srull (1989), .

Affect-as-information

Schwarz and Clore (1988) reviewed models accounting for affective influence on judgments involving mood congruent recall from memory (Bower, 1981; Isen, 1984; Isen, Shalke, Clark & Karp, 1978). They proposed an alternative model whereby inferences are drawn from an affective state in a controlled way rather than with mood congruent material being automatically recalled. That is, affect is used as information. They proposed that future research should identify the conditions under which individuals are likely to use recalled information and be subject to mood congruence effects, and when current feelings are likely to be used to inform a judgment. Schwarz, Strack, Kommer and Wagner (1987) found strong mood effects for judgments of global life satisfaction, but not for judgments of satisfaction in relation to specific issues. From this it seemed that affect was used as information for judgments of global life satisfaction, but not for specific issues.

Bower's (1981, 1991) network theory and affect priming

Studies by Bower (1981) demonstrated the influence of affective state on all sorts of cognitive processes. He proposed an associative network theory to account for his findings of mood state dependent memory and mood congruent recall. His theory was descended from the more general semantic network theory of cognitive psychology (Anderson & Bower, 1973; Collins & Quillian, 1969) and posited emotion nodes in an associative network and the spreading of activation throughout it. Affective influence on cognition involved a system whereby events were grouped according to their associated emotions, resulting in state dependent memory, with a selective focus on events consistent with current mood and selective retrieval of events from memory. Although this should occur in natural as well as laboratory situations (Bower, Monteiro, & Gilligan, 1978; Carlson & Hatfield, 1992), Bower and Mayer (1989) failed to find consistent evidence for mood dependent retrieval with six studies.

In 1991, Bower reviewed his associative network theory and described it as involving a number of emotion nodes biologically wired into the brain. Some innate and some learned environmental situations could activate a particular emotion node. When this happens, as the result of particular recognition rules, activation spreads to a variety of indicators including characteristic physiological and facial expressions, to memories of events associated with that emotion, and to interpretive rules for classifying the social world. The amended network model assumed that the attitudinal object could be associated directly with the affective valence, as well via the belief, as supposed in the 1981 model. The model sums positive and negative evaluations and so is algebraic (cf. Anderson, 1974; Fishbein & Ajzen, 1975) so that the greater the quantity of data available to the subject, the less the influence of an extra piece of information.

Bower (1991) proposed that emotional influences could arise via various mechanisms. Earlier learning could influence interpretation of a present event as positive or negative. Mood could increase a person's attention to mood congruent facts and also the extent of

rehearsal of such facts. These two factors could result in stronger associations from the attitude object to the fact and to the congruent valence node, leading to a correlation between biases in recall and judgment. Mood at judgment time could spread and indirectly influence the apparent activation level of the positive versus negative valence node attached to the attitude object, which would distort the relative valences in a mood congruent direction. The mood prevailing at judgment time would temporarily move the judgment in the direction of the congruent valence node as was found by Clore (1985).

Implications for his amended model were outlined by Bower (1991) as follows.

- (i) Emotional influence could be widespread, affecting topics temporally removed from the event or memory that created the mood as found by Johnson and Tversky (1983).
- (ii) The latency of an affective decision about an attitudinal object would be in inverse proportion to the dominance of one valence node over the other, consistent with findings of Forgas and Bower (1987).

However, Bower (1991) saw some problems with the amended model, for example, the effect of the prevailing mood can be over-ridden by a strong, pre-formed opinion as demonstrated by Schwarz and Clore's (1988) life satisfaction study. Bower acknowledged that the model needed further development and lacked parsimony.

In his critique of Bower's (1981) model, Blaney (1986) distinguished between state dependent memory and mood congruence as follows. State dependent memory involves mood at the time of learning being associated with superior remembering of the material when the person is in the same mood. This has been best substantiated in relation to drug-induced states, for example cigarette smoking induces a state which influences recall (Peters & McGee, 1982). Mood congruence assumes that material is more likely to be stored and/or recalled when its affective content is related to current

mood. For example, Clark and Teasdale (1982) showed that depressed people tested on two separate occasions indicated fewer happy memories when more depressed and more when they were less depressed. Blaney indicated that overall, while the evidence for state dependent memory was mixed, evidence for mood congruence was consistent and that Bower's model inadequately distinguished between effects of state dependence and mood congruence. The model assumes automatic processing. Blaney saw Bower's model as being similar to Tompkin's (1981) view of affect as amplification of responses evoked by stimulation of "retrieved memories" and "constructed thoughts". He also compared it with depth of processing models underlying research on self-schemas in depression (cf. Ingram, 1994). However Blaney emphasised the need to distinguish between mnemonic effects of mood per se and mnemonic effects of cognitive structures associated with mood such as self-image and self-schemata. Mayer, Gayle, Meehan and Haarman (1990), in an experiment involving 196 participants, found mood congruence which was not confounded by instructional manipulations, by reported mood strength or by personality variables. They interpreted their findings in terms of a model involving spreading activation due to cognitive priming rather than to mood as such.

Singer and Salovey (1988) comprehensively evaluated Bower's (1981) network theory of affect and concluded that there was some empirical support for the theory – results for congruency in encoding have been consistent with its predictions. They indicated, however, that experimental findings are not entirely supportive: for example, there are more reliable findings of happy mood congruence than of sad mood congruence. Mood maintenance and repair were proposed as a possible underlying mechanism for the lack of consistency with the model. Stegge (1991) suggested that Bower's model was too simple to explain the complex relationship between affect and cognition. Stegge emphasised the role of motivational, social and cultural factors in mediating mood influence on cognition and advocated greater attention to the circumstances in which mood influences cognition. Rinck, Glowalla and Schneider (1992) found mood-

congruent learning for strongly emotive words: people induced with a sad mood recalled strongly unpleasant words better and those induced with a happy mood recalled strongly pleasant words better. However they found mood incongruence for weakly emotive words. They concluded that mood does not produce mood congruent learning directly and automatically, as implied by a simple network model of emotion, but in a more complex way than represented in Bower's model. They proposed a two-component processing model with variations in task or materials being responsible for the different findings.

Bower's (1981) model was considered inadequate by Isen (1984). She discussed the work of Johnson and Tversky (1983) in relation to the predictive validity of a spreading activation model and found Bower's model to be unsupported by their findings. Reading about a serious health event influenced predictions of unrelated negative life events as much as it did more closely related serious health events. Alternative explanations put forward by Isen were:

- (i) with a schema or contextualist theory (e.g. Bransford, 1979), feeling would function in a similar way to meaning and lead to a deeper level of organisation (Craik & Lockhart, 1972) or to a more elaborated representation (Craik & Tulving, 1975), *and*
- (ii) given the instantaneous processing of affect (Zajonc, 1980) and its experiential quality, affect could be both semantic and experiential.

Wyer and Srull's (1989) model

Wyer and Srull (1989) outlined a detailed and complex model for social information processing including affective influences on processing and judgment. Their model, appears to be a descendant of Bower's (1981) model, with emotions represented by concepts. These concepts are contained in a "semantic storage bin" in a Permanent Storage Unit, that is in long term memory. When a person experiences internal reactions an emotion concept (e.g. anger) can be activated by the Encoder/Organiser, a

higher order interpreter used when there are specific goal-related processing objectives, and inferences may be made. Additionally, emotion concepts, either specific or generic, may be found in referent bins; recall of a thought can result in re-experiencing associated feelings. Emotion concepts can also be represented in relation to specific goals such as the elimination of an unpleasant emotion (cf. motivated processing). Wyer and Srull saw Bower's (1981) model as involving a closer association between emotion and cognition nodes than their own more complex model. Both models are quite different from Zajonc's (1980) model with its independent systems for affect and cognition.

Anderson's (1983) model as developed by Branscombe (1988)

Branscombe (1988) held the view that affect and cognition are processed within the same system. He adapted Anderson's (1983) model of information processing to take affective phenomena into account. Anderson's model was seen as useful because of its distinction between procedural and declarative knowledge, each having different properties of storage, representation and activation. Declarative knowledge was seen as a propositional network with concepts in long term memory represented as associatively linked nodes (cf. Bower). Procedural knowledge involved "condition-action pairs" which are selected and fired when the conditions match the external environment or fit models retained in working memory. According to Branscombe, both affect and cognition could be processed at or below the level of awareness.

Interacting Cognitive Subsystems model (Barnard & Teasdale, 1991; Teasdale, 1993; Teasdale & Barnard, 1993)

Teasdale (1993) itemised problems with Bower's model. As regards mood congruence, problems are both empirical – with failure to replicate mood state dependency – and theoretical – in that too many nodes would be required, diluting mood effects to become negligible. Additionally, the model fails to account for the distinction between *cold* and *hot* cognition (Zajonc, 1980) and for the fact that emotional experiences can be

remembered without, as well as with, emotion. Barnard and Teasdale (1991), Teasdale (1993), and Teasdale and Barnard (1993) extended Barnard's (1985) Interacting Cognitive Subsystems (ICS) framework to include the interaction of cognition and emotion and provided a possible solution for the problems inherent in Bower's model. The ICS approach involves qualitatively distinct types of information codes at various levels (Barnard & Teasdale, 1993). These codes have the following functions.

Three encode sensory information

- (i) Acoustic,
- (ii) Visual, *and*
- (iii) Body state.

Two encode information required for effector action

- (i) Articulatory for speech *and*
- (ii) Limb.

Two encode immediate structural level descriptions capturing recurring irregularities in sensory code patterns encountered

- (i) Morphonolexical from irregularities in acoustic code *and*
- (ii) Object from Visual code; *and*

Two encode specific and generic levels of meaning

- (i) Propositional, e.g semantic networks
- (ii) Implicational integrates lower codes and captures high level irregularities in the world, body and mind producing models of experience.

The ICS model, then, assumes two levels of meaning – specific and holistic – with emotional processes linked only to holistic meaning.

Some insights from Fiedler's (1990) analysis

Fiedler (1990) provided a useful summary of the principles underlying most studies of affect and cognition. These were mood congruency (Bower & Cohen, 1982; Nasby &

Yando, 1982; Snyder & White, 1982), state dependency (Weingartner, Miller & Murphy, 1977) and resource allocation (Ellis & Ashbrook, 1988). According to Fiedler, mood congruency involves the relationship between a person's mood state and the affective tone of the stimulus, resulting in an interaction between mood and stimulus valence. State dependency involves an interaction between people's mood states at the time of learning/encoding and at retrieval/recall. Resource allocation involves an interaction between emotional influences on memory and the quantity of cognitive resources taken up with competing tasks. Although these principles appear intuitively obvious, Fiedler (1990) indicated that they are not always supported by experimental findings (Bower & Mayer, 1985; Clark & Teasdale, 1985; Mecklenbrauker & Hager, 1984). He nonetheless indicated that this lack of positive evidence might be the result of weak mood manipulation, poorly controlled material or other experimental problems. Hasher, Rose, Zacks, Sanft and Doren (1985) however, had found that naturally occurring mood variations among university students did not usually lead to cognitive effects. Fiedler's (1990) view was that these findings were too readily dismissed by their critics.

Another issue dealt with by Fiedler (1990) was that of self-reference as a catalyst for emotional influences on cognition. Theoretical explanations for the dependence of cognition on emotional factors in the case of self-reference, have included that:

- (i) self-schemata suppose that experience about the self is more highly elaborated and organised than other knowledge structures (Markus, 1977)
and
- (ii) material related to the self is emotionally arousing (Brock, 1988).

Fiedler opted for an interpretation of emotional influence on cognition in terms of the particularly active nature of information related to the self and the high involvement of "productive" elements.

Fiedler (1990, 1991) also reinforced the need for clarification of theoretical and empirical concepts, and emphasised that the empirical evidence for classical mood effects on memory, person judgment, and social interaction is equivocal. As an alternative to Bower's network theory, he proposed a dual-force model involving two alternative processes or forces, those of passive conservation of given information and/or those of active generation of new information.

Some other issues

Mood congruent memory and natural mood

Mood congruence has been explained by spreading activation models of memory (e.g. Bower, 1981; Collins & Loftus, 1975). For these models to be upheld mood congruent memories would be expected with natural, as well as with induced, mood. Findings have been equivocal. Some experimenters (Mayer, Gashke, Braverman & Evans, 1992; Mayer & Hanson, 1995) have failed to establish mood congruent judgments with natural mood, but Mayer, McCormick and Strong (1995) were able to demonstrate such mood congruence. These different findings might have been due to experimental conditions. The following have been proposed as conditions under which mood effects are likely to be obtained: (i) correlating a single pleasant-unpleasant dimension of mood with a single pleasant-unpleasant dimension of the cognitive response of interest, (ii) counterbalancing valence of items, (iii) temporal proximity of task and mood measure (iv) use of ambiguous items (Mayer & Hanson, 1985), and (v) testing participants in the absence of extraneous mood-biasing or lengthy tasks (Mayer, McCormick & Strong, 1995). The difference between natural and induced mood received attention in the work of Kwiatowski and Parkinson (1994) who found differences in the performances of naturally depressed and induced-depressed people. Naturally depressed participants showed no deficits in a word recall task compared with non-depressed, but induced-depressed people showed poorer recall.

Personality and mood/cognition

Mayer and Salovey (1988) assessed findings on the implications of personality for the ways that mood and cognition affect each other. They examined the interaction between moods originating in both state and trait domains. They also noted a further layer of complexity in the experience of mood, a meta-mood experience, whereby people have cognitions about their moods while having them. Mayer and Gaschke (1988) identified five factors describing such cognitions, with thoughts only sometimes congruent with mood. Hence mood control could be dependent on evaluations people make of their moods, with healthier personalities more able to regulate their moods. Such meta-mood beliefs were found by Mayer, Marnberg and Volanth (1988) to influence judgments but surprisingly, mood repair efforts did not. (An example of an effort at mood repair given by these authors was "I am thinking good thoughts to cheer up my bad mood".) Mayer, Salovey, Gomberg-Kaufman and Blaney (1991) emphasised that emotion-related experience (with physical, emotional and cognitive dimensions) includes mood management processes which moderate the management of the mood (resulting in thoughts of action, suppression, denial). Such an ability to monitor, discriminate between and act upon, one's own emotions, or those of others, was described by Mayer and Salovey (1993) as emotional intelligence and this ability can result in mood regulation (cf. also Barnard & Teasdale's, 1991, ICS model).

Mayer and Salovey (1988) proposed that people can moderate affect because mood is self-relevant or because self-relevant information can lead to changes in cognition. Regarding the first, Salovey and Rodin (1985) found that self-relevant mood inductions produced more consistent and more symmetrical results than did empathic procedures. Regarding the second, independent of mood, self-relevance enhances memory for emotional material (Miall, 1986; Rogers, Kuiper & Kirker, 1977) perhaps because of a greater depth of processing (Craik & Tulving, 1975). Findings of Rogers, Kuiper and Kirker (1977) indicated that self-reference involves a powerful encoding process, with the self acting as a superordinate schema involved in the processing, interpretation and

memory of personal information. Blaney (1986) found that participants encouraged to focus on the self-relevance of stimuli showed greater mood congruent processing effects than those asked to focus on other (semantic, or phonemic) aspects. For judgments involving the choice of a suitable working partner, Forgas (1989) found similar effects for personal relevance. Pietromonaco and Markus (1985) found a direct relationship between self-relevance of judgments and mood effects in depressed people. A question arising is: under what conditions does the self-relevance of an issue result in mood congruence and when does mood repair occur? This is relevant for predicting the type of processing which will occur (e.g. substantive or motivated).

Markus and Wurf (1987) summarised the information processing consequences of the self-structure as follows. People show a heightened sensitivity to self-relevant stimuli (Bargh, 1982). Self-congruent stimuli are efficiently processed (Markus, 1977). Self-relevant stimuli show enhanced recognition and recall (Markus, 1980). Individuals make confident behavioural predictions in self-relevant domains (Anderson, 1984) and individuals are resistant to information incongruent with their self-structure (Markus, 1977). Markus and Wurf (1987) emphasised the dynamic nature of the self-concept, seeing it as an active, interpretive structure, fundamental to a person's affective and cognitive systems, integral to establishing meaning, and involved in the regulation of affect. Sherman, Judd and Park (1989) endorsed the notion of the dynamic self, which involved a stable core self and a working self and also involved changing in response to environmental demands. Mackie and Skelly (1994) proposed that the activation of the self-concept when self-relevant information is involved was likely to result in the formation and maintenance of attitudes congruent with the self-concept.

Salovey (1992) found that both positive and negative, but not neutral, moods induced self-focused attention. In terms of natural mood states, Pyszczynski, Holt and Greenberg (1987) examined depressed and non-depressed people's judgments of the probability of positive and negative life events occurring to themselves and to others and found that

depressed people were less optimistic than non-depressed people. Ellis and Ashbrook (1988) appealed to reduced allocation of resources (Kahneman, 1973) to explain the effect of depressed mood on memory. Their idea was that the depressed mood itself occupied or blocked some of the available cognitive capacity.

Dual process models to explain the role of affect in social judgment

The material so far reviewed points to the processing of information in dual or multiple ways. Models for information processing recognise that individuals have limited attentional capacity and therefore need mechanisms to determine how much attention will be devoted to a particular task.

Affect has been conceptualised as influencing social judgments, either by providing information, with such models accounting for mood congruent judgmental biases, or by influencing processing strategies. The two information accounts are referred to as affect-as-information and affect-priming models. The affect-as-information model (e.g. Clore & Parrott, 1991) is based on an attributional framework with people using their affective state to make judgments. The affect-priming model (e.g. Forgas & Bower, 1988) proposes a selective activation and greater availability of mood-primed associations in constructive processing of social information. Processing strategy explanations emphasise the influence of mood on processing strategies, with a varying extent of mood influence depending on the style of processing used (Chaiken & Eagly, 1983; Clark & Isen, 1982; Petty & Cacioppo, 1986).

Clark and Isen (1982) adopted Posner and Snyder's (1975) distinction between automatic and controlled processing to explain the complex ways that feelings influence behaviour. Clark and Isen proposed that automatic priming of compatible material might occur in association with both positive and negative feelings. Controlled, effortful processes might be used to move the feeling state in a positive direction. Persuasion research has also yielded dual processing models (Chaiken, 1980,

1987; Petty and Cacioppo, 1981, 1986) with some similarity to each other, but different from the dual process model proposed by Clark and Isen (1982).

Petty and Cacioppo (1981, 1986) put forward an Elaboration Likelihood Model (ELM) in the context of the role of affect in persuasion. They proposed that attitudes are formed, and changed, by effortful, elaborative *central route* processing and after such attitudes are formed they are relatively persistent and predictive of behaviour. However because people are “cognitive misers” (Taylor, 1981) some attitudes are formed, and changed, by shallower *peripheral route* processing with the resultant attitudes being less persistent, and less predictive of behaviour. The model predicts that high personal relevance would also be associated with more elaborative processing. Cacioppo and Petty (1982) found that people’s need for cognition influenced the type of processing used with a high need for cognition associated with more elaborative processing. Affect was predicted to be used as information or to bias information processing when people were highly motivated, but used as a peripheral cue when motivation or ability were low, or when people were uncertain about the importance of the issues (Petty, Cacioppo, Sedikides & Strathman, 1988).

Chaiken (1980, 1987) also advocated a dual processing system referred to as *systematic processing* for detailed, attentive processing and *heuristic processing* for that occurring when simple cues were used. To a considerable extent these terms parallel the central versus peripheral route processing of Petty and Cacioppo (1986).

Bohner, Chaiken and Hunyadi (1994) contrasted the differing predictions of the heuristic-systematic (HSM) and the elaboration likelihood (ELM) models and specified the particulars of their applicability. They indicated that the models differ in the relation between the processing modes: the routes for the ELM are alternative whereas with HSM the processes can occur simultaneously and thus heuristic processing, for

example, could bias systematic processing. Their experiment supported the bias hypothesis and simultaneous processing of the HSM.

Fiedler (1988) built on Kelly's (1955) description of therapeutic progress whereby people increased their ability to broaden and narrow their focus as the situation warranted. Fiedler suggested that such a loosening and tightening of constructs could describe the cognitive processes used by people in positive and negative moods respectively. "Loosening" would correspond to heuristic processing and "tightening" to systematic processing.

In summary, dual process models, that is, models which allow for different types of processing according to different circumstances – for example, attentional capacity, amount of distraction, the importance of the processing outcome – have made an important contribution to our understanding of how emotional factors might influence social judgments.

Conclusions

It is now generally acknowledged that affect influences cognition. The mechanisms for such influence are the subject of considerable observation, experimentation and debate, which have not yet provided a consistent and generally accepted overarching conceptual framework.

Chapter 3

Forgas's Affect Infusion Model for Social Judgments

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Development of the Affect Infusion Model

The difficulty of developing an overarching conceptual framework accounting for the various and varied findings in relation to affective influences on cognition has been generally acknowledged. Such a difficulty was highlighted by Forgas (1991b) who outlined as many as four types of theoretical framework for understanding the effect of mood on social judgments, namely,

- (i) information storage and retrieval models, based on cognitive research on memory processes (Bower, 1981, 1991; Isen 1984),
- (ii) attributional or judgmental heuristic models (Schwarz & Clore, 1988),
- (iii) information integration models (Anderson, 1974), *and*
- (iv) models focusing on alternate processing strategies and processing capacity variables (Chaiken, 1980, 1987; Petty & Cacioppo, 1981, 1986).

These models are referred to in the course of this thesis. Over the current decade, Forgas (1992a, 1992c, 1994a, 1995b) has developed a model which accounts for many of the experimental findings in relation to affect and social judgments – a particular aspect of cognition.

The history of the development of the AIM can be sketched as follows. Forgas and Bower (1987) thought of cognitive priming models, for example, Bower's (1981) network model, as providing a reasonable, if still not completely adequate, account of their findings of mood congruence in relation to person perception. They indicated that sociocultural variables should be incorporated into such cognitive priming models to account for the complex processing involved in making social judgments (cf. Clore, 1985; Forgas, 1981, 1983). They considered that their data might be partly accounted

for by other theoretical models derived from research into social comparison processes (Festinger, 1954; Wills, 1981), misattribution theory (Clore, 1985) and by the effects of self-esteem. However, Forgas and Bower (1987) thought that cognitive priming models (Bower, 1981, Clark & Isen, 1982), which enabled predictions about judgment times and memory, provided better accounts of their findings.

Forgas (1989, 1991d) emphasised the importance of the personal relevance of a decision in influencing the extent of mood effects on cognition and Forgas, Bower and Moylan (1990) investigated mood effects on attributions people made for their achievements. They recognised that transient moods might influence attributions in at least two ways:

- (i) by influencing cognition and processing strategies (Bower, 1981; Clore & Parrott, 1991; Isen, 1984; Levanthal, 1980), *and*
- (ii) by influencing motivation (Bradley, 1978; Clark & Isen, 1982; Stephan & Gollwitzer, 1981; Swann, Pelham & Krull, 1989; Wills, 1981).

Their finding that sad mood resulted in self-deprecation was consistent with cognitive, rather than motivational, theories (Forgas, Bower & Moylan, 1990).

Forgas (1992c) proposed a multi-process model, built on those of Brewer (1988), Fiedler (1990) and Petty, Gleicher and Baker (1991), to account for mood effects on social judgments. The four processing strategies Forgas identified in this and subsequent papers were direct access, motivated, heuristic and substantive processing. These four strategies involved full or partial information search extent, open-ended or closed processing and a range of processing depths. Forgas (1992a) described his model as a new and comprehensive model of social judgmental processes. He drew upon, and integrated, informational theories, particularly affect-priming (Bower, 1981, 1991) and affect-as-information (Clore & Parrott, 1991; Schwarz & Clore, 1988) as well as process-oriented models, for example, the dual process models (Fiedler, 1990; Isen,

1987; Petty, Gleicher & Baker, 1991; Schwarz, 1990). He outlined four assumptions about social judgment processes.

- (i) Alternative processing strategies are available. This assumption was an extension of the dual-process models for attitude formation and change of Chaiken (1980, 1982, 1987), Chaiken, Liberman and Eagly, (1989) Eagly and Chaiken (1983) and Petty and Cacioppo (1981, 1986).
- (ii) Mood effects depend on the processing strategy used.
- (iii) Affect can sometimes influence both the processing strategy used and the judgment itself, either indirectly through priming or directly as information.
- (iv) People use the least effortful strategy required by the circumstances, that is they are “cognitive misers” (Petty, Gleicher & Baker, 1991; Taylor, 1981).

Forgas’s (1992a) model indicated four types of processing, with the type of processing used influencing the extent of affective influence on a judgment. The four judgment types, dealt with here in the order used by Forgas, were as follows.

- (i) A *direct access strategy* involves a full search with a closed (directed) search strategy whereby pre-existing judgments are retrieved and implemented. This strategy is used when the target of the judgment is well-known and familiar, the judgment has no personal relevance to the judge, no motivational, affective or cognitive forces are present and additionally that the situation does not require detailed processing.
- (ii) A *motivated processing strategy* involves a partial search extent and a closed (directed) search strategy. It was compared by Forgas (1992a) with Zajonc’s (1980) model whereby preferences guide inferences. Here the judgment is motivated. That is, it is driven by a specific pre-existing goal such as to maintain or to repair mood. Such processing is likely when the target is unfamiliar and there is no pre-existing assessment available, the judge has a strong objective in making the judgment, and the search involves the selective pursuit of a motivational goal.

- (iii) A *heuristic processing strategy* is an effort-minimising method relying on any available simplifications, and involves a partial search and an open-ended search strategy. It is likely when the target is simple or typical, the issue has low personal relevance to the judge, who has no specific motivation, limited cognitive capacity, and may be in a positive mood. Accuracy is not deemed important and the situation does not require detailed processing.
- (iv) A *substantive processing strategy* involves a full search extent and an open search strategy. It involves selecting, learning, and interpreting novel information about a target and relating this to pre-existing knowledge to make a judgment. It is likely when the target is atypical, unusual or complex, the judge has no specific motivational goal, has adequate cognitive capacity, may be in a negative mood, wishes to be accurate, and where the situation imposes demands. It was described, nevertheless, as being automatic and uncontrolled.

Forgas's (1992a) multi-process model posited mechanisms for two different types of affective influences on judgments. These were mechanisms for:

- (i) informational effects which may be due to indirect priming (Bower, 1981) or to a direct informative function of feelings (Schwarz & Clore, 1988) *and*
- (ii) process effects which influence information-processing strategies and judgments (Fiedler, 1991; Isen, 1984).

These mechanisms provided the basis for mood congruency in judgment, with mood congruency occurring because mood provides relevant information for use in making a judgment, either indirectly through primed associations (Bower, 1981, 1991), or directly through misattribution (Schwarz & Clore, 1988). According to the multi-process model, affect-priming is likely with substantive processing, and affect is likely to be used as information with heuristic processing.

Forgas (1994a) named his integrative multiprocess theory the *Affect Infusion Model* (AIM) of social judgments adopting the term *affect infusion* to refer to “the process whereby affectively loaded information influences and becomes part of the judgmental process, entering the judge’s constructive thought processes, and eventually colouring the judgmental outcome” Forgas (1994a, p. 2). In the use of this term he drew upon Feshbach and Singer’s (1957) account of affective influence on cognition. Feshbach and Singer had proposed that when a specific affective state is aroused there is a tendency for it to become connected to “contemporaneous percepts and ideation”. They described the process as “the infusion of cognition with affect” and incorporated the psychodynamic notion of *projection*, a process whereby a person ascribes his or her own emotions or beliefs to another (Reber, 1985) as the mechanism for such influence.

Forgas’s AIM might therefore be economically depicted as in Figure 3.1 which shows how four judgmental strategies can result, depending on whether the information search process is closed (directed) or open, and whether the search extent is partial or full.

Conceptual issues

Forgas (1994a) recognised a lack of agreement in definitions of terms relating to emotion. He defined affect as including both mood and emotions. Moods were defined as being low intensity, diffuse and enduring feeling states with no salient cause and little cognitive content. Emotions were defined as higher intensity, short-lived feeling states with a definite cause and clear cognitive content. Additionally, Forgas saw moods rather than emotions as having the more significant effects on cognition.

		Search Extent	
		Partial	Full
Search Process	Closed (No/little affect infusion)	MOTIVATED eg mood control Target: unfamiliar Judge: • motivated Situation: no pre-existing assessment	DIRECT ACCESS eg stereotyping Target: well known or familiar Judge: <ul style="list-style-type: none"> • no personal relevance • no motivational forces • no affective forces • no cognitive forces Situation: no situational force mandating elaborative processing
	Open (Affect infusion)	HEURISTIC affect as information eg misattribution Target: simple or typical Judge: <ul style="list-style-type: none"> • low personal relevance • no specific motivation • cognitive capacity limited Situation: does not require accuracy nor substantive processing	SUBSTANTIVE affect-priming Target: complex or atypical Judge: <ul style="list-style-type: none"> • no specific motivational goal • adequate cognitive capacity Situation: requires accuracy

Figure 3.1 A representation of Forgas's Affect Infusion Model (AIM) for the processing of social judgments.

Evidence in support of, and contrary to, the AIM

The phenomenon of mood congruence (i.e. the better memory of material when affective content is related to current mood) has been established over many types of judgments (Bower, 1981; Clark, Milberg & Ross, 1983; Forgas, 1994b; Forgas & Bower, 1987; Forgas, Bower & Krantz, 1984; Forgas & Moylan, 1987; Forgas & Moylan, 1991; Erber, 1991; Isen, Shalke, Clark & Karp, 1978; Johnson & Tversky, 1983; Mathews & Bradley, 1983; Schwarz & Clore, 1983; Teasdale, Taylor & Fogarty, 1980). Forgas's AIM proposed that the occurrence and extent of such mood effects depended on the type of processing strategy used, with mood effects being most likely when constructive processing is used, that is, under heuristic and substantive processing. Affect-as-information was proposed as the underlying mechanism for heuristic processing and affect-priming for substantive processing.

Evidence related to direct access judgments

Forgas (1994a, 1995b) indicated that although direct access judgments are probably common, such judgments have been the subject of few specifically focused studies. Hence evidence tends to arise as a by-product of studies with other goals. Forgas indicated that Srull (1983, 1984) found no affective influences in judgments on familiar products, in contrast to his finding of mood effects with unfamiliar products. Patterns found by Srull (1983, 1984) were echoed by findings of Schwarz, Strack, Kommer and Wagner (1987), who found that for specific judgments mood effects were non-significant, but for the more complex global judgments mood effects were strong, with mood apparently being used as a source of information. Levine, Wyer and Schwarz (1994) likewise found a similar pattern for specific, compared with global, self-esteem issues.

Salovey and Birnbaum (1989) in their experiment with healthy participants reported no mood effects for health judgments about familiar positive health events, in contrast to their findings of mood effects with unfamiliar negative health events. Their negative health event items were: contracting some form of cancer, being a victim of fire, being the victim of a violent street crime, developing high blood pressure, becoming an alcoholic, developing diabetes, developing arthritis, being involved in an automobile accident and having a stroke. As positive health event items Salovey and Birnbaum used the following: achieving great cardiac fitness, regularly maintaining a well-balanced diet, regularly maintaining an exercise program, lowering cholesterol levels, being in great physical shape, learning relaxation skills and reducing tension, maintaining ideal body weight and reducing exposure to toxic substances. Forgas (1994a) suggested that the lack of mood congruence for positive health events might be due to access of pre-formed opinions. It is at least arguable, though, that it would be no easier for people to access information on positive than on negative items. Also, it could be argued that the health items actually used by Salovey and Birnbaum (1989) were not, on the whole, ones with which students would be particularly familiar.

In summary, Forgas (1994a) noted an absence of mood effects precisely as his AIM predicted for direct access processing.

Evidence related to motivated processing

Forgas (1994a) also reported on studies showing lack of affect infusion under conditions for motivated processing. Forgas (1989, 1991d) found no evidence of affect infusion in partner choices, where, instead of using affective information, subjects focused on, and made judgments assisting in, mood repair. Weary, Marsh and Gleicher (1991), Weary, Marsh and McCormick (1994) and Erber and Erber (1994) all found no evidence of affect infusion in conditions of motivated processing. Achee, Tesser and Pilkington (1994) provided another example of lack of affect infusion in motivational processing with their findings indicating maintenance of a stable self-evaluation.

Sedikides' (1994) findings however, indicated that the situation might be more complex than allowed for by the AIM. He found evidence that mood repair seemed to occur after initial mood effects, with mood congruence being registered first, and with this being followed by mood incongruence. Such a shift of processing style would require building sequential processes into the AIM and giving it a temporal dimension.

In summary, although there is evidence that motivated processing obviates affect infusion as hypothesised by the AIM, it is arguable that this has not been universally upheld in experimental findings.

Evidence related to heuristic processing

Forgas (1994a) reported results of a number of studies (e.g. those of Bower, 1981; Clore & Byrne, 1974; Forgas & Moylan, 1987; Isen, 1984; Schwarz & Clore, 1983; Srull, 1983; Schwarz, Strack, Kommer & Wagner, 1987) which were all run in conditions likely to call on heuristic processing, where significant mood effects were found for judgments about people, life events and life satisfaction. Forgas viewed mood

congruency in judgments as occurring through misattribution (heuristic processing) or because affect informs a judgment through primed associations (substantive processing).

Evidence related to substantive processing

Of particular relevance to this thesis is Forgas's (1994a) description of affect infusion under substantive processing. He indicated that the most basic judgments requiring a degree of substantive processing (cf. Kelly, 1955) are likely in the observation and interpretation of ongoing social behaviours such as those reported by Forgas, Bower and Krantz (1984) who found mood congruent effects when happy and sad subjects made judgments about videos of their interactions the previous day. Forgas further suggested that more complex stimuli requiring more elaborate processing could show even greater influence of mood, giving as a possible example, the findings of Salovey and Birnbaum (1989) that some health judgments made by healthy people were subject to mood influence. Also in support of the model were the findings of Forgas, Bower and Moylan (1990), who, following Heider (1958) and Weiner (1980), studied the role of affect in inferences and found that affect significantly influenced causal attributions, particularly for participants in a sad mood.

Mood congruent effects on persuasion were found by Bohner, Chaiken and Hunyadi (1994). Petty, Gleicher and Baker (1991) found greater mood effects when the message was personally relevant or ambiguous and when subjects had a high *need for cognition*, defined by Cacioppo and Petty (1982, p. 116) as "the tendency for an individual to engage in and enjoy thinking" in understanding and making sense of the world. Wegener, Petty and Klein (1994) found that subjects with a high need for cognition, and therefore tending to use substantive processing rather than heuristic, showed an influence of happy mood in judgments. This did not apply to those with a lower need for cognition. For subjects with a high need for cognition, positive arguments were

more effective for those in a positive mood, and negative arguments for those in a negative mood. Again this did not apply to subjects with a low need for cognition.

Because of the importance of processing differences in the AIM, Forgas (1994a) emphasised the importance of response time data in providing evidence for evaluating different processing styles. In their study of mood influence on impression formation Forgas and Bower (1987) reported that response time data supported the cognitive-priming principles of Bower's (1981) "spreading activation" model and Clark and Isen's (1982) cognitive priming model. Participants took longer learning about mood consistent details but made mood consistent judgments faster, than with mood inconsistent details and judgments. Happy participants formed more positive impressions and judgments than did sad. Cued recall and recognition memory were better for mood consistent characteristics, with positive mood having a greater effect on judgments and memory than negative mood.

The AIM predicts that the more a person thinks about a judgment, the greater the likelihood of affective influence. This was upheld by an experiment in which Forgas (1992d) manipulated mood and also task difficulty, by varying the "typicality" of target students, from a verbal description, e.g. whether a medical student fitted the commonly held student stereotype. Consistent with the AIM, Forgas (1994a) found greater mood effects on processing and judgmental latencies for atypical than for typical targets. In an experiment controlling for cognitive priming effects, pictures of well-matched or badly-matched couples were used as target stimuli (Forgas, 1993a, 1995a). Affect infusion and judgmental processing latencies were greater for atypical couples than for typical couples. Forgas (1994b) found that people induced with a sad mood made more negative judgments about themselves than did those induced with happy moods. The predictions of the AIM were also upheld in relation to negotiation outcomes and strategies (Forgas & Moylan, 1995).

Other evidence for the AIM

Support for the AIM comes also from the following findings.

(i) Sedikides' (1995) findings were in accordance with his differential sensitivity hypothesis, itself based on Forgas's AIM. Central and peripheral self-conceptions were found to be differentially sensitive to the influence of mood. Peripheral self-conceptions were influenced by mood, which Sedikides interpreted as being due to their being less elaborated and held with less certainty, allowing affect-infusion. However, central self-conceptions were unaffected by mood having incurred direct access or motivated processing.

(ii) Bohner, Crow, Erb and Schwarz's (1992) study of affective influences on persuasion found that people in an elated mood were less likely to engage in systematic processing than those in neutral or mildly depressed moods, again consistent with the AIM.

(iii) Most studies where mood congruence has been established have involved experimental manipulations of mood followed by the making of judgments. A variant, as in the work of Forgas and Moylan (1987), involved movie-goers who had just viewed affectively toned films and who were then asked to make judgments. Mayer, McCormick and Strong (1995) also found evidence for mood congruent memory associated with natural mood.

Assessment of the model, its strengths, limitations and boundaries

The AIM in relation to Abele and Petzold's (1994) findings

Challenges in establishing a theoretical framework for mood influence on social judgments were explored by Abele and Petzold (1994) who indicated the difficulty in arriving at an empirical decision between two models, because existing models arrive at similar predictions for the influence of mood on judgments and the assumptions

underlying the mediating processes are often not clearly delineated. They adopted an information integration approach (cf. Anderson, 1981) to clarify mechanisms underlying mood influences on social judgments. They made the following assumptions about the processes mediating the impact of mood on social judgment. Mood acts:

- (i) as a prime for the retrieval and/or generation of additional information,
- (ii) as a cue for the change of meaning of incoming information,
- (iii) as information to be directly incorporated into the judgment, *and*
- (iv) as information for selective weighing of incoming stimuli, with negative mood leading to selective attention and to a selective weighing of information.

In work involving induction of negative and positive mood with audiovisual material, they confirmed a mood congruency effect and found that the final judgment was consistent with an averaging process of mood dependent global impression formation and mood independent stimulus information.

Abele and Petzold (1994) discussed their findings in relation to other models. For example the mood-as-information model (Schwarz & Clore, 1983) could be viewed as having two strategies as extremes on an information integration continuum. On the one hand the mood could be used to make a judgment, or, on the other, the stimulus could be used if the mood had been discredited. Likewise, the amended network model (Bower, 1991) involved a strength of association between object and valence nodes, equivalent to the weighing of information. Of the four processing strategies proposed by Forgas (1992c), Abele and Petzold saw their information integration approach as most closely related to his substantive processing strategy. The characteristics of substantive processing are a full search for information and no pre-determined outcome of the judgment. Both the substantive processing strategy and the information processing approach predict a stronger mood influence for atypical than for typical information. Global impressions were also shown by their study to be mood dependent.

However, predictions concerning information quantity would differ between the models, with Forgas's substantive processing strategy predicting stronger mood influence with more information whereas the information integration paradigm makes the opposite prediction as the weighting of mood would be reduced. This issue remains unresolved because there have been empirical findings in favour of both assumptions (Abele & Petzold, 1994).

Schwarz and Clore's (1996) assessment of the AIM

Clore and Parrott (1994) acknowledged the value of Forgas's (1992a) framework accommodating both affect priming and affect as information accounts of affective influence on judgments. One of the few attempts to assess the AIM has been provided by Schwarz and Clore (1996) who commended its attempt to integrate the array of mechanisms proposed for the way that affect and cognition influence each other. Schwarz and Clore endorsed the principal features of the AIM. However they indicated that its ambiguities highlight the inadequacy of current knowledge. Problems Schwarz and Clore detailed in relation to the model were as follows.

(i) Mood is assumed not to play a part in the direct access strategy, but stereotyping, an example of use of the direct access strategy given by Forgas (1992a), was found by Bodenhausen, Kramer and Susser (1994) to be more likely to be used when people are in a good, rather than bad, mood.

(ii) The conditions identified by the model as triggers for the various strategies were seen to be problematic, with evidence inconclusive and compatible with various assumptions. Such ambiguity was exemplified by the AIM proposing that complex judgments trigger substantive processing, and simple tasks heuristic processing, whereas Schwarz, Strack, Kommer and Wagner (1987) suggested that feelings are used as an heuristic to simplify complex tasks: experiments had not distinguished between mood-as-information and mood congruent recall. Schwarz and Clore (1996) also asked

whether reliance on feelings as a source of information necessarily reflected an heuristic processing strategy, indicating that in the case of judgments of liking, mood is likely to reflect the most accurate information available.

(iii) Different findings as regards symmetry and asymmetry in relation to happy and sad moods raise further issues. Schwarz and Clore (1996) examined the assumptions that sad mood triggers substantive processing and mood congruent recall and elaboration, and that good mood triggers heuristic processing. Such assumptions would imply that the impact of a happy mood reflects the use of mood-as-information processes, and that, by contrast, the impact of sad mood would reflect mood congruent recall processes. Schwarz and Clore (1983) had found to the contrary that the impact of sad moods was more reliably eliminated with misattribution manipulations than was the impact of happy moods. Also, according to Singer and Salovey (1988), although happy participants are more likely to recall positive material, sad participants are not more likely to recall negative material. They noted difficulties in reconciling these findings with the rather symmetrical effects of happy and sad moods in studies cited by Forgas (1992a) as evidence for mood congruent recall in social judgments.

Overall then, the model, in distinguishing between four processing strategies, is able to account for the variability in mood effects on judgments, but is not always predictive.

Some findings contrary to predictions of the AIM

As indicated previously, the findings of Curren and Harich (1994) were opposite to what might be expected on the basis of the AIM. Curren and Harich took the intuitive view that when people make an evaluation which is personally relevant they are likely to think carefully to avoid making errors and that mood is less likely to influence the judgment. If an evaluation were less important, people were more likely to use heuristic processing and mood was more likely to influence a judgment. Contrary to the predictions of Forgas's (1992a, 1992c, 1994a, 1995b) model their expectations were

supported by their findings. In relation to (i) personal computers and (ii) a course outline of relevance to the participant group, they found that, after mood inductions, involving (i) film or (ii) false feedback about achievement, decisions were not influenced by good or bad mood when the evaluation had been manipulated to be important to the student participants.

Another finding contrary to the AIM was that of Storchheim (1995). Unlike Curren and Harich, whose hypotheses were drawn up without reference to Forgas's model, her experiment was conducted to test it. Her participants, who had been induced with happy or sad moods with an autobiographical mood induction, showed no tendency towards mood congruent bias in judgments of applications of males and female for a stereotypically male job (cf. Forgas, 1992b; 1992d; 1993a; 1995a). She proposed that motivated processing might preclude mood effects in value-laden judgments, although, on the basis of the model, measurements of response time suggested that substantive processing was likely to have occurred.

The AIM is elegant in defining four processing strategies for making social judgments. Despite its apparent complexity, it is in essence a simple model defining the principle that the greater the extent of processing the greater the extent of affect infusion. Given the existence of evidence contrary to the predictions of the AIM, an exploration and elaboration of this principle is indicated.

Some theoretical issues

Some more general theoretical issues in relation to Forgas's (1992a, 1992c, 1994a, 1995b) model are as follows.

Are the quadrants of Forgas's model logically consistent?

It might be expected that the quadrants of the model, when represented as in Figure 3.1, might show contrasting characteristics (*present* or *absent*) from quadrant to quadrant

according to search process and search extent. However, such contrasts are not always apparent.

To what extent are the quadrants of Forgas's model distinct?

The model indicates that the degree of affect infusion into judgments varies along a processing continuum but the four processing strategies are in fact identified as alternatives to each other. Although Forgas apparently does not view these strategies as discrete options, combinations of strategies are not dealt with by the model. Such a simplification is reasonable for conceptual purposes but has implications for the running of experiments. Experimental manipulations would need to be such that processing style was reasonably constant throughout the making of judgments during an experimental session.

'Multiplier effect' inherent in Forgas's model

Substantive processing is more likely when the judge is in a negative mood (Forgas, 1994a). Indeed, a fundamental feature of the AIM is that sad mood is likely to be associated with a greater depth of processing and therefore with a longer processing time. Another feature is that the longer the processing time, the greater the opportunity for mood to influence a judgment. There would therefore seem to be a multiplier effect intrinsic to the model, with negative mood increasing the very type of processing which enables mood most to affect judgments, and positive mood minimising that type of processing and therefore its own effects on judgments. This feature is not clearly spelt out in descriptions of the AIM.

Some queries about some assumptions of the model

(i) In describing affect infusion there is an assumption that the entity *affect* exists. However there is still doubt as to what constitutes affect. An assumption of the model appears to be that affect is not a product of thought. This may well be the case, but it is neither a certainty nor a necessity.

(ii) Motivation is arguably inseparable as a construct from information processing (Tetlock & Levi, 1982) yet Forgas assumes it is separate.

(iii) Affect is assumed to influence judgments in two ways: firstly by affect-priming of affect-related contents and secondly as a means of providing information to the individual about his/her evaluation. These two different affective constructs need to be further delineated and their relationship defined. Affect-as-information might just as well be the mental product of cognitive algebra (Anderson, 1981) rather than affect per se, in the sense of the term as used in relation to affect-priming.

(iv) Affect appears to be a basis for 'motivational judgment' with negative mood resulting in behaviours intended to result in mood repair. The non-involvement of affect in such a strategy might be queried.

(v) Erber and Erber (1994) investigated mood incongruent recall and mood self-regulation, and found the effort involved in retrieving a memory which was incongruent with prevailing mood to be partly responsible for mood alleviating effects of mood congruent recall. They also found that although mood congruent recall occurred in the absence of a motivation to change their mood, people make an effort to regulate mood, particularly sad mood, when a situation requires level-headedness. This appears inconsistent with Forgas's model which suggests that people in a sad mood think most about decisions.

(vi) Forgas noted the lack of agreed definitions for the terms: affect, feelings, emotions and mood. His decision to focus on moods, which are more enduring, rather than on emotions, which are brief, in an effort to integrate affect into psychological research, seems a reasonable one. Other experimenters (e.g. Frost & Green, 1982) however, have indicated difficulties in inducing an enduring mood state and therefore the length of time a mood endures might be an issue in experimental work. Hence, if

the AIM explains moods, not emotions, and as it could be argued that experiments tend to involve manipulation of emotion, not mood, their direct relevance to the AIM could be considered problematic.

What is a social judgment?

A question which inevitably arises is: what constitutes a social judgment? Such a judgment might be conceptualised as relating to judgments only in interpersonal contexts. However the term appears to have taken on more inclusive connotations and to include judgments in a social context. A subsidiary issue, then, relates to determining or defining precisely what cognitions might be considered to be social in character. To what other sorts of judgments might Forgas's model extend and on what bases? Forgas (1991b) in his introduction to *Emotion and Social Judgments*, included other judgments which involve the self and/or others under the umbrella of social judgments. Examples he gave are: reactions to socio-political slogans, perception of fear in others, judgments about the self and others and health judgments.

One of the earliest uses of the term 'social judgments' was by Sherif and Hovland (1961). Sherif's theory related to attitude change and emphasised the role of a person's perception and judgment of a persuasive communication, with such judgments mediating attitude change; the term "social judgment" embraced "social issues and communication concerning them" (p. 11). They conceptualised that a "social reference scale" was used by members of groups in judgments in relation to political, religious, ethical and aesthetic issues for example. Such scales were said to be psycho-social in origin, and were gauged against social realities, and defined and regulated the individual's relationship with other people and groups. Eiser (1991) defined social judgment in terms of how people make sense of the social world but also indicated a lack of consensus as to what the social world includes.

Summary

The AIM is a multi-process model which accounts for varied findings for mood effects on social judgments, in terms of four different processing strategies used in the making of such judgments. The model integrates informational theories such as the affect-priming of Bower's (1981, 1991) network model and affect-as-information (Clore & Parrott, 1991; Schwarz & Clore, 1988) and dual-process model (e.g. Fiedler, 1990; Isen, 1987; Petty, Gleicher & Baker, 1991; Schwarz, 1990). Many empirical findings can be accounted for in terms of the AIM but its adequacy as a predictive model has been questioned.

The AIM then, despite some contradictory findings, provides a way of integrating the complex array of findings in relation to mood effects on judgments which, rather broadly, could be described as being social in nature. According to the model, affect is most likely to influence such judgments during the more elaborative substantive or heuristic processing.

Chapter 4

Health Judgments

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Health Judgments

Rationale for investigation of affect infusion and health judgments

The stimulus for the investigation of mood effects on health judgments reported in this thesis was Forgas's (1994a) suggestion that perceptions of symptoms, health efficacy and expectations of future disease (Salovey & Birnbaum, 1989) were "complex stimuli that require more elaborate processing" than those which involved observation and interpretation of interpersonal behaviours (Forgas, Bower & Krantz, 1984) and therefore might show "even greater mood effects".

Health related behaviours

Over the last three decades an increasing emphasis on reducing, as well as curing, illness has led to the development of theories for understanding health related behaviours (Sheridan & Radmacher, 1992). These include self-efficacy theory (Bandura, 1977, 1982; Beck & Frankel, 1981; O'Leary, 1985) the health belief model (Becker, 1974; Becker & Rosenstock, 1987) and the theory of reasoned action / theory of planned behaviour (Ajzen & Fishbein, 1980; Ajzen & Madden, 1986; Fishbein & Ajzen, 1975). A detailed analysis of these theoretical models is beyond the scope of this thesis, but these models and their concepts inform the discussion of health judgments which follows.

Early researchers in behavioural health, Turk, Rudy and Salovey (1984), noted that in the USA the most common causes of death involved health risk behaviours such as a high cholesterol diet, sedentary lifestyle, obesity, cigarette smoking, excessive consumption of alcohol and failure to wear seat-belts. In their investigation of correlations between the perceived importance, and the frequency of performance, of

health-protective activities they found a “reasonably high degree of consistency” between attitudes and behaviours in the three groups measured: college students, high school teachers and nurses. This was consistent with the general findings of a strong attitude-behaviour relationship by Eagly and Chaiken (1993) in response to the concerns raised by Wicker (1969). Further, they found that two dimensions – the degree of effectiveness of the behaviour and the amount of effort involved in the behaviour – between them accounted for 57% of the variance, providing support for the health belief model. The authors indicated that public health agencies had typically been concerned with conveying information on behaviour without sufficiently considering its effectiveness.

O’Leary (1985) found that perceived self-efficacy was important in determining health-promoting behaviour of people attempting to reduce drug, alcohol and cigarette use, for those aiming to increase exercise levels, and for speed of recovery from illness and trauma. She also found self-efficacy beliefs to be important in predicting health behaviour in smoking-cessation relapse, pain management, eating disorders, cardiac rehabilitation and adherence to preventive health programs.

Kreitler and Kreitler (1991) provided a psychological profile of the health-oriented individual indicating links between health-orientation and well-being. They found that high scorers on health orientation scored higher on various factors including love, joy, contentment, emotional reactions, positive day-dreams, internal control and hostility, and lower on factors including depression, anxiety and somatic complaints.

Reasons for studying links between mood and health

‘Rational’ models might be of limited use in predicting health related behaviour because they do not take account of uncertainty about outcomes, cognitive and emotional overload from awareness of risks and the dynamics of performing a behaviour (Adler, Kegeles & Genevro, 1992). Similarly, Gold (1993) pointed out that

the theory of reasoned action assumes 'off-line' rather than 'on-line' processing (Hastie & Park, 1986), akin to 'cold' rather than 'hot' cognitions (Zajonc, 1980). An investigation of the influence of 'hot' cognitions on judgments seems indicated. For example, Gold (1993) dealt with the relationship between mood-congruence, or non-mood-congruence, and health related behaviours, specifically in terms of sexual risk-taking. He indicated a need for more research on mood, attitude change and behaviour specifically in relation to the remedy/prevention of human immuno-deficiency virus (HIV/AIDS). Richard, van der Pligt and de Vries (1995) also highlighted the importance of affective factors in safer sexual practices, with their findings indicating the greater predictive power of affective factors over the components of the theory of planned behaviour.

Selye's (1956) work provided a model linking stress with physiological consequences for the human body. Salovey, O'Leary, Stretton, Fishkin & Drake (1991) indicated that medical practitioners and psychotherapists have observed associations between psychological distress, expressed as depression and anxiety, and physical symptoms, such as back pain, headaches, dizziness, bowel and bladder irregularities and gastric problems. The provision of appropriate treatment for such psychological and physical difficulties depends on an accurate separation of psychological from physiological sources in medical diagnoses. They suggested that mood change might result in changes in the evaluation of physical symptoms, and subsequently in health and illness judgments. Mood might directly influence physical health: Husband (1994) discussed ways in which the activities of bodily systems involved in emotion influence activities of other aspects of bodily function including the immune system.

However, a cautionary note was sounded by Watson and Pennebaker (1989), who, recognising the assumption of current health psychological models that stress adversely affects health, collected measures of personality, health and fitness, stress and current emotional functioning and found that both self-report ratings of health and of stress

were correlated with negative affect. They concluded therefore that stress and health associations are likely to be over-estimated. Also, Anderson and Lobel (1995) found that positive natural mood, and negative natural mood, along with perceived vulnerability to illness and 'vitality' (strength, appetite, vigour and energy) significantly contributed to self-assessed health, independent of physical symptoms and disease. They proposed that the association of mood and vulnerability with self-assessed health might also be related to the commonly held belief that stress results in ill-health.

Types of studies of health judgments

Often the focus in health judgment studies has been on symptomatology, but more recently, the influence of moods on perceptions of physical symptoms and judgments about health has been considered (Salovey, O'Leary, Stretton, Fishkin & Drake, 1991). Investigations of health judgments made by healthy people have traditionally drawn on models such as those provided by self-efficacy theory, the health belief model and the theory of reasoned action (Turk, Rudy & Salovey, 1984).

Mood influence on self-efficacy beliefs

Kavanagh and Bower (1985) found that happy and sad moods influenced self-efficacy judgments, for example on interpersonal and athletic activities. They interpreted their results in terms of Bower's (1981) network theory, having ruled out three other explanations:

- (i) that instead of mood, results were due to the cognitive priming of the particular mood induction technique (romantic success/failure),
- (ii) that network theories predict a gradient rather than a generalisation across domains, *and*
- (iii) that mood influences the calibration or anchoring of the likelihood rating itself so that a happy mood causes people to use high numbers and a sad

mood low numbers on a rating scale, this last being rejected on the basis that Wright and Bower (1981) had shown otherwise.

Optimistic bias and health

Weinstein (1980) found that student subjects displayed an unrealistic optimism (“optimistic bias”) about the likelihood of both positive and negative life events for themselves, perhaps due not only to cognitive errors, but also to motivational factors. Rodin and Salovey (1989) proposed that, perhaps because of attributional processes, people underestimated their own risk, relative to that of other people, for illnesses and for negative life events including ill health. People who have not experienced major negative life events would see themselves as particularly invulnerable. They noted a decrease in optimistic bias in people in dysphoric moods demonstrated by findings of Johnson and Tversky (1983) and Salovey and Birnbaum (1989) who found such moods to be associated with increased estimates of risk.

Taylor and Brown (1988, 1994) emphasised the value of unrealistic optimism in helping people to feel better and to cope more successfully as well as to recover quickly from health related stressors although this has been contested by Block and Colvin (1994) and Colvin & Block (1994). Peterson & Bossio (1991) indicated that optimism fosters general health. More generally, Schwarzer (1994) stressed the importance of optimistic self-beliefs, because they help in goal-setting, action initiation and motivation, thereby facilitating behaviour change.

Correlational studies by Kulik and Mahler (1987) demonstrated an optimistic bias in both healthy and unhealthy people. However, whereas healthy people showed equivalent optimistic bias for health and non-health events alike, ill participants expressed greater feelings of vulnerability to future illness of any type, than to future non-health problems.

Scheier and Carver (1987) reviewed reports of research findings on the relationship between dispositional optimism and physical well-being in terms of positive health outcomes. They suggested that helpful coping strategies facilitated by optimism might be associated with efficient functioning of the immune system. Optimism was thought to be associated with problem-solving coping and both optimism and pessimism with emotion-focused coping. Problem-solving coping strategies were advocated by Lazarus (1966) as an effective way of dealing with stress by removing or reducing threat. Emotion-focused coping, however, has the advantage of reducing distress and this in turn makes coping easier (Lazarus & Folkman, 1984).

Millar and Millar (1995) proposed and established that thinking about behaviour aimed at protection against disease, would lead to more negative moods than thinking about health promotion behaviour, because resulting cognitions can threaten perceptions of good health. This could provide an alternative account for Salovey and Birnbaum's (1989) differential findings on mood for negative and positive health events, although it would require negative questions to be presented en bloc, not interspersed with positive questions as Salovey and Birnbaum presented them.

Mood and judgments of health status

Research findings in clinical and health psychology suggested that mood influences judgments of health status (Croyle & Uretsky, 1987). In view of the high number of somatic ailments reported by depressed people, health psychologists had suggested that emotional state might influence subjective health appraisals in non-clinical populations. Croyle and Uretsky ran two experiments, specifically to ascertain whether mood influenced subjective appraisals of health, and, more generally, to study mood effects on judgment. Their first experiment involved the induction of happy and sad moods with videos. Participants were then asked to imagine an illness-related scene (a sore and bruised arm of unknown origin), to indicate their response to such a scenario (visiting the doctor, degree of concern, assessment of whether illness/disease was indicated) and

then to make judgments of their own actual health status (poor to excellent). There were no differences between mood groups for the imagined scenario. However, when asked to make judgments about their real life situation, those participants induced with a positive mood judged their health more favourably than those induced with a negative mood. Their second experiment investigated factors mediating the effect of mood on the participant's current health status perceptions. Mood inductions were followed by participants being asked to imagine an illness-related or an illness-unrelated scenario. A third group was not presented with a scenario. The authors proposed that this might indicate that negative mood influences subjective appraisals of health by increasing the accessibility of illness-related memories. Mood-regulation was proposed as important in maintaining positive self-appraisal of health. They highlighted the importance of elucidating whether memory and judgment might be independently influenced by mood (cf. Fiske & Taylor, 1984). Their investigations indicated that negative mood can influence health judgments by increasing the accessibility of illness-related memories (Isen, 1984; Tversky & Kahneman, 1973).

Noting the associations between psychological distress and physical illness and the lack of verification of a causal path between the two, Salovey and Birnbaum (1989) investigated mood effects on health related cognitions. Their work followed that of Croyle and Uretsky (1987) who had shown that healthy people in whom a sad mood had been induced made lower ratings for their health status than those in a happy mood. Salovey and Birnbaum noted that as well as influencing symptom appraisal, mood is likely to influence other health cognitions including self-efficacy beliefs (Bandura, 1977) and the perceptions of costs, benefits and efficacy of the behaviour (Becker, 1974). They proposed that Wright and Mischel's (1982) findings, that positive affect resulted in people forming optimistic expectations about future performances and negative affect in pessimistic expectations, might generalise to the health area. People's beliefs about their vulnerability to illness and about risk likelihood were cited as other

health cognitions which might be influenced by mood (Becker, Haefner, Kasl, Kirscht, Maiman & Rosenstock, 1977; Weinstein, 1982, 1983).

Salovey and Birnbaum (1989) ran three experiments involving students being induced with happy, neutral or sad moods and then being asked to make various health judgments which they predicted would be mood-congruent. Two of their experiments used participants with colds or 'flu, and a third used healthy people. Procedures for all three experiments were quite similar. Their third experiment, involving healthy people, will be dealt with here in more detail, as it was the one most directly related to the present research.

Their first experiment involved sick people, who had been induced with a happy, neutral or sad mood. They were asked to rate their physical symptoms, their perceived ability to carry out illness-alleviating behaviours and their expectation of the outcome efficacy of such behaviours. The natural mood of the participants apparently over-rode effects of induced mood in some instances and the variances differed across mood groups. Therefore the use of correlations of actual mood score with ratings given by participants rather than analysis of variance was proposed as being more likely to pick up mood effects. This experiment indicated mood-congruence effects on appraisal of some symptoms and on health-behavioural efficacy. The authors proposed two possible explanations.

- (i) Sad mood might have promoted self-focused attention, thereby directly influencing symptom appraisal.
- (ii) Sad mood might facilitate the recall of congruent material.

The second experiment also involved sick people, but this time investigated mood effects on perceived vulnerability to future positive and negative health events. In contrast to the findings of Johnson and Tversky (1983) for various sorts of risks, analysis of variance on ratings for the three mood groups showed little effect on sick

people's judgment of future events. However the correlation between participants' reported mood and estimates of future positive events was significant. The authors suggested that the participants, being ill, might have based future judgments on their current state, resulting in an attenuation of mood effects. Ill subjects showed sex differences with respect only to health self-efficacy, with men reporting greater self-efficacy for illness alleviating behaviour than did women.

The third experiment was carried out with healthy people to test this explanation. Participants were 33 undergraduate psychology students. The mood induction procedure, for this, as for the previous two experiments, was five minutes of tape-recorded instructions for participants to relax and then to imagine a situation that would leave them feeling in a happy, neutral or sad mood (Wright & Mischel, 1982). They reported choosing this procedure because it had been shown by Brewer, Doughtie and Lubin (1980) to be more effective than Velten's (1968) method of mood inducing self-statements.

Mood prior to induction was assessed using the Profile of Mood States (POMS, McNair, Lorr & Droppleman, 1971). Cold and 'flu symptoms were assessed using a modified version of the Wahler Physical Symptoms Inventory (Wahler, 1968). After the mood induction procedure mood ratings were made to establish that the required moods – happy, neutral or sad – had been successfully induced. The dependent variables were drawn from participants' likelihood estimations (for the average student and for themselves) for 14 health related outcomes (both positive and negative). Participants made likelihood ratings on a 7-point scale (1 = extremely unlikely, 7 = extremely likely). Participants' perceived vulnerability, with separate scores for positive and negative health events, was calculated by subtracting their estimates for the average student from their estimates for themselves.

Their results indicated that there were no gender differences for any likelihood ratings for healthy subjects. Although mood congruence was not found on positive health items it was demonstrated on negative health items: the sad group gave the highest ratings for negative health events, followed by neutral and then happy groups. Further, participants always maintained an optimistic bias in making health estimates for themselves relative to others, but this was much larger in happy people than in sad people, in whom such bias was attenuated.

Salovey and Birnbaum (1989) suggested that mood might have had a greater effect on negative items than on positive items. For negative items there would be little previous experience, rendering the judgments more hypothetical and therefore subject to greater affective influence. For positive items there is likely to be a pre-existing knowledge-base on which the person could draw (Mayer & Salovey, 1988).

The researchers reported that comparison of the results of the third experiment with the second showed that current health status moderated mood effects on health judgments. An optimistic bias was maintained with sick and with healthy participants, with both happy and sad people believing negative outcomes were more likely for others than themselves. This was attenuated in sad, healthy people and accentuated in happy, healthy people where the accessibility of self-relevant knowledge apparently resulted in less effect of mood. It was suggested that mood affects health related behaviour by influencing judgments of self-efficacy and risk, with shifts in judgments reflecting mood-induced changes in attentional focus and memory retrieval (cf. emotional intelligence as defined by Salovey & Mayer, 1990).

As a result of their findings, Salovey and Birnbaum (1989) suggested some possible mechanisms for the occurrence of mood influence. Negative mood might result in increased self-focus, possibly because it clarifies the affective experience (Scheier & Carver, 1987). Affect should also increase the accessibility of mood-congruent material

(Blaney, 1986; Gilligan & Bower, 1984; Isen, 1984, Mayer & Salovey, 1988; Singer & Salovey, 1988). Such mood-congruent material need not relate to the experience which caused the current mood (Bower, 1981). Judgments are often based on what is easily accessible (Tversky & Kahneman, 1973) thereby enabling mood-congruence in judgments (Mayer & Bremer, 1985; Mayer & Volanth, 1985). Mood can influence the categorisation of information in memory (Mayer, 1986). Overall, they concluded, mood should influence health-appraisal, risk estimates, and expectations of efficacy and outcome, by facilitating recall of either pleasant or unpleasant memories related to health or illness. This was seen to be further substantiated by Croyle and Uretsky's (1987) finding of mood effects on health appraisal and illness reporting after an imagined health scenario.

Some explanations for mood effects on health judgments

Pyszczynski, Holt and Greenberg (1987) found evidence that the high level of self-focus associated with depressed people was associated with their relative pessimism compared with non-depressed people on judgments of the probability of future positive and negative life events occurring to themselves and others.

Salovey, O'Leary, Stretton, Fishkin and Drake (1991) indicated the value of the laboratory induction of mood states followed by self-judgments of physical health as a paradigm for understanding the association between mood and health, and reviewed Salovey and Birnbaum's (1989) findings. They compared their findings of the association of mood and efficacy expectations with Kavanagh and Bower's (1985) findings on romance, on athletics and on altruism (Salovey, 1986; Salovey & Rosenhahn, 1989). They proposed that whereas Salovey and Birnbaum's participants could draw on accessible self-knowledge about positive health events (such as diet) the negative events involved thinking about possible occurrences at an indeterminate time for which there was unlikely to be relevant self-knowledge. This provided an explanation for the finding of mood effects on negative health events (but not on

positive health events) with healthy subjects. They pointed out that mood has a stronger impact on judgments which are not firmly anchored (Sherif & Hovland, 1961) in pre-existing knowledge (Forgas & Bower, 1987). Hypothetical judgments were thought to be more likely to be influenced by affect as it provides a substantial proportion of information in an information-poor context (Salovey & Mayer, 1990). Skelton and Strohmets (1990) found that health cognitions were rendered more accessible after their participants had been asked to make abstract decisions about health connotations of common words.

Because health information is often ambiguous and difficult to understand, Salovey, O'Leary, Stretton, Fishkin & Drake (1991) considered that contextual factors such as mood were more likely to influence its interpretation (cf. Forgas, 1994a). Taking into account various levels of analysis, Salovey et al. (1991) described possible mechanisms to explain the associations between mood and health judgments:

- (i) mood-congruent recall,
- (ii) mood induced shifts in attentional focus (attention to self when sad):
 - (a) at cognitive level *and*
 - (b) at physiological level.

The authors suggested that, at the physiological level, changes in mood would alter endocrine and immunological functioning and affect health status. However mood effects at the immunological level would be more likely in the longer rather than in the immediate term.

Medical care-seeking

On the basis of their findings, Salovey and Birnbaum (1989) suggested that a sad mood, in intensifying the illness experience, might result in a sick person being more likely to seek medical care. Also because depressed mood increases the accessibility of illness related memories (Croyle & Uretsky, 1987) an illness is likely to be diagnosed as more serious if a patient is in a sad rather than in a happy mood. However, sad mood

apparently reduces efficacy beliefs and hence health-promoting behaviours (Salovey & Birnbaum, 1989). Stretton, Salovey and Mayer (1992) investigated the role of concern for health in health relevant cognitions and behaviours and found that people concerned about a health problem might not necessarily report it. As negative mood has been shown to influence people's perceptions of personal risk of disease, they therefore proposed that negative mood might lead to feelings of vulnerability that increased the apparent likelihood of illness, thereby increasing the level of health concern. They indicated that the findings of their study suggested that health concerns, e.g. in hypochondriasis, could be altered by interventions focused on negative mood and self-awareness.

Asymmetrical mood effects

Research following on from that of Croyle and Uretsky (1987) and Salovey and Birnbaum (1989) was performed by Abele and Hermer (1993). They assessed findings reported in the literature for the effects of positive compared with negative mood on self-appraisal of health as inconclusive. Watson and Pennebaker (1989) had assumed that mood effects on health self-appraisal were due to 'negative affectivity' assuming it almost axiomatic that people in a negative affective state make more negative judgments. Croyle and Uretsky's findings of correlations between mood and health judgments for negative, but not positive mood, had supported this view. Salovey, O'Leary, Stretton, Fishkin and Drake (1991) also predicted that health judgments would be more distorted by negative than by positive mood. Their basis was that negative mood is associated with increased self-focus resulting in an increased awareness of bodily symptoms with an associated tendency towards unfavourable health judgments. However their findings only partially supported this idea. Scheier and Carver's (1987) interpretation of their findings was that positive mood resulted in response bias. This was supported by Salovey and Birnbaum's (1989) finding of a stronger influence of positive mood than of negative mood on unrealistic optimism. Abele and Hermer (1993) concluded that apparently the relative impact of negative

compared with positive mood depends on the task, but that overall there are more cases of negative mood induced bias in health judgments than there are positive.

Abele and Hermer's (1993) experiments covered a greater range of health risks than those of Salovey and Birnbaum (1989). Also, the negative outcomes and time intervals for the probability estimate were more specific: they asked for estimates of headaches within four weeks, accidents within a year. Like Salovey and Birnbaum they used an autobiographical mood induction and they checked the autobiographical material for health and illness content. They used an 11-point rating scale to assess mood before and after the judgment task. Also like Salovey and Birnbaum, they asked participants to make ratings for themselves and also for other people their age.

Their experiment investigated the influence of positive compared with negative mood on:

- (i) self-appraisal of health status, in terms of present health, future health risk and unrealistic optimism, *and*
- (ii) appraisal of the noxiousness of unhealthy behaviours, for example, no regular exercise, regularly less than eight hours sleep, unbalanced diet for a long period of time.

Negative mood was found to result in more negative appraisals, except for unrealistic optimism. Positive mood was associated with higher noxiousness ratings of unhealthy behaviours than negative mood. Mood effects were independent of sex, health locus of control and number of days' illness during the year, which they had thought might moderate the relationship between mood and health judgments. Like Salovey and Birnbaum (1989), Abele and Hermer found that women appraised future health-risks less favourably than did men, but there were no other sex differences for other variables including mood. Participants in a sad mood always made the most unfavourable health judgments. Positive mood rarely led to more positive health-appraisal than did the

control condition. Unrealistic optimism regarding hypothetical future events was more influenced by positive than negative mood, as also found by Salovey & Birnbaum (1989). Abele and Hermer thought that the hypothetical nature of their unrealistic optimism task might both prevent a stronger influence of negative mood and facilitate optimistic bias. Applications they saw from their work were that mood repair treatments, over and above their intrinsic advantages, might also be expected to improve the extent of health protective behaviours. As they indicated, their research left unanswered the question of whether positive mood leads to behavioural effects as well as to increased cognitive vigilance.

Assessment of health judgment findings in relation to the AIM

Forgas (1994a) indicated that affect infusion during substantive processing can be established through the analysis of response time data: an association between mood effects and processing time was fundamental to Forgas's AIM. None of the studies reviewed involving mood and health, including that of Salovey and Birnbaum (1989), has involved a measure of response time. Although Abele and Hermer (1993), Croyle and Uretsy (1987), and Salovey and Birnbaum (1989) found some mood effects in relation to health judgments consistent with Forgas's model, associated measures of processing time would be necessary for its validation with respect to health judgments.

Chapter 5

Rationale for Experimentation and Research Aims

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Rationale for Experimentation and Research Aims

Issues relating to affect and cognition are important in understanding the formation and modification of attitudes and the making of judgments. The study of affective influences on cognitive processes in general, and on judgments in particular, has been characterised by attempts to reconcile the conflicting data commonly obtained. Forgas's (1992a, 1992c, 1994a, 1995b) AIM provided an integrative framework accounting for many of the experimental findings in relation to affect and social judgments. Forgas's model proposed that the extent to which mood influences a judgment, that is, the extent to which affect infuses it, is predicated on the cognitive processing style used. Heuristic and substantive styles, which involve more extensive processing, were more likely to bring about affect infusion than direct access and motivated styles, which involve less processing. Some findings of Salovey and Birnbaum (1989) in relation to health judgments were interpreted by Forgas (1994a) as providing evidence of affective influence during substantive processing.

The original plan for this research

The research reported in this thesis began in 1994 in an attempt to investigate mood influences on attitude change and persuasion, by juxtaposing Forgas's (1994a) AIM for social judgments, with information processing models of attitude change, such as those of Chaiken and Eagly (1983), Eagly and Chaiken (1993) and McGuire (1969). The research plan was

- (i) to develop a suitable non-verbal technique for inducing happy, neutral and sad moods,
- (ii) to confirm affect infusion in judgments in a specific area of interest, *and*
- (iii) to investigate affective influences on attitude change.

Judgments and attitude change were to be investigated specifically in relation to health issues.

Research rationale

The overall rationale for the research was as follows. According to Forgas's (1994a) AIM for social judgments, and based on Salovey and Birnbaum's (1989) findings, healthy people in a sad mood should take longer to process health-relevant information and be more pessimistic about both the possibility and the outcome of modifying their behaviour than those in a happy mood. These judgments were to be tested over a range of health judgments and health related messages.

In relation to more specific issues concerning persuasive messages, rationales were as follows.

- (i) For mood inductions, a non-verbal technique was considered preferable to prevent interference with the content of persuasive messages.
- (ii) Rhodes and Wood (1992) had found that persons of moderate self esteem were more influenced by persuasive messages and therefore a self esteem inventory (Marsh, 1991, Self Description Questionnaire III: Subscale for the General Self) was administered.
- (iii) Affective influence on persuasion was more likely in people with a high need for cognition (Cacioppo & Petty, 1982; Fiske & Taylor, 1991; Petty, Gleicher & Baker, 1991; Wegener, Petty & Klein, 1994) and therefore a short form of the need for cognition scale (Cacioppo, Petty & Kao, 1984) was administered.

The self esteem and need for cognition scales were used so that participants of moderate self esteem and/or with a high need for cognition could be chosen, if necessary, for later experiments on persuasion.

In the light of the experimental findings as this study progressed, however, it was decided to narrow down the research to replicating Salovey and Birnbaum's (1989, Experiment 3) findings and investigating the applicability of Forgas's AIM to health judgments.

Chapter 6

Experiment 1: A Comparison of some Non-verbal Methods of Inducing Mood, with Each Other, and with an Autobiographical Method

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The aim of this experiment was to establish an effective non-verbal method for inducing happy and sad moods. Effective mood induction techniques are important because, as Ellis and Ashbrook (1988) observed, for causality to be inferred a true experiment is necessary and this requires (successful) mood manipulation. An effective non-verbal method, if available, was considered important in case any verbal content should confound judgments of verbal material for use in proposed experiments investigating mood effects on persuasive messages. Additionally, non-verbal methods were expected to lead to more effective mood retention (Stein & Bransford, 1979).

A variety of methods for the induction of temporary mood states has been developed for studies in both clinical and laboratory contexts (see Martin, 1990). However the more effective methods, such as self-statement, autobiographical recall, imagery, hypnotic suggestion and performance feedback, have often been closely associated with self-concept or have involved verbal content. A problem with material related to the self-concept is that it might confound effects in judgment studies (Klein & Kihlstrom, 1986). Again, with verbal mood induction methods, verbal content in the induction procedure could interfere with the effects of verbal messages planned for use in the originally proposed studies.

In addition to being a verbal method, the traditional Velten (1968) mood induction method which uses self-statements, has the disadvantage that it induces the required mood in only 50% of participants (Martin, 1990). Music, unaccompanied by any other stimulus, would seem to be an ideal non-verbal means of modifying mood. However it has been suspected by some researchers of being ineffective, possibly because it lacks a

semantic priming component (Fiedler, 1991). Also music is quite variable in its mood effects, because of subjective prior associations (Green, Rogers & Elliman, 1995). It was therefore considered useful to find and validate a mood induction procedure not too closely related to the self-concept and free of verbal material.

This experiment therefore tested the relative effectiveness of four types of mood induction: audio-only (music with no words), visual-only (a silent sequence from a film), audiovisual (these audio and visual presentations presented together) and a standard autobiographical verbal induction (cf. Baker & Guttfreund, 1993; Martin, 1990; Schwarz & Clore, 1983; Wright & Mischel, 1982). Stimuli shown in earlier pilot studies as likely to induce a happy, neutral or sad mood, were used.

Prior to mood inductions a short form of the need for cognition scale (Cacioppo, Petty & Kao, 1984) was administered. This was to investigate the parameters of need for cognition (Nc) scores for the participant pool (university students) because Petty, Gleicher and Baker (1991) had found that people with a high need for cognition more frequently processed persuasive messages substantively and therefore, according to Forgas's (1994a) AIM would be more likely to show affect infusion.

Hypotheses

The hypotheses for this experiment were that with effective mood inductions

- (i) participants subjected to happy mood inductions would make mood ratings significantly higher than baseline ratings
- (ii) participants subjected to sad mood inductions would make mood ratings significantly lower than baseline ratings
- (iii) participants subjected to neutral mood inductions would make mood ratings not significantly different from baseline ratings.

Method

Participants

Forty-eight university students, 24 males and 24 females, of mean age, $M = 21.87$ years ($SD = 6.70$) were recruited to participate in a pilot study for experiments on attitude change.

Design

A 4 x 3 factorial design was used. Induction method (audio-only, visual-only, audiovisual, autobiographical) was a between subjects factor and mood type (happy, neutral, sad) was a within subjects factor. Order of mood induction type was counterbalanced. The dependent variable was mood rating. The design is shown in Appendix A.

Apparatus and materials

A participant consent form provided information to prospective participants. The (short form) 18 item need for cognition scale (Cacioppo, Petty & Kao, 1984), entitled a “social cognition questionnaire” in participant questionnaire sheets, was administered before any other intervention. Copies of all protocols for this experiment are found in Appendix A.

Sound and visual stimuli were presented to participants from a videorecorder and a 34 cm television screen. Headphones were worn by all participants for audio, visual and audiovisual presentations. A blindfold was worn for the audio-only condition. Participants whose mood was induced by autobiographical induction were seated at a desk in the same room as that used for audio and/or visual inductions.

A previous pilot study with 18 participants had been used to establish that the sound and visual stimuli for mood induction were appropriate for happy, neutral and sad

moods (cf. Forgas, 1991d; Forgas; 1993a, Forgas, 1994b; Forgas, Bower & Moylan, 1990). Sound tracks, containing music but no words, were chosen from different musical sources (happy: various Scott Joplin tracks, neutral: Richard Clayderman's *A Dream of Love*, sad: some *Elegaic Melodies* of Edvard Grieg). Visual tracks were edited from happy, neutral and sad portions of the film *The Gods must be Crazy*, all with the sound track removed. Autobiographical mood induction stimuli (Baker & Guttfreund, 1993; Martin, 1990; Schwarz & Clore, 1983; Wright & Mischel, 1982) were typed instructions for participants to write about happy or sad incidents in their lives and for the neutral condition participants were instructed to describe the street in which they had lived at the age of about 10 years.

Questionnaires were used to ascertain mood before, between and after inductions (cf. Forgas, 1991d). Each questionnaire was similar and comprised eight bipolar scales with a sad/happy analogue scale embedded in second position amongst other distractor scales: alert/drowsy, calm/excited, lethargic/energetic, attentive/dreamy, interested/-bored, depressed/elated and muzzy/focused (cf. Bond & Lader, 1974; Herbert, Johns & Dore, 1976). A sample of such a questionnaire, entitled 'Visual Analogue Scale' forms Appendix A5. The purpose of the distractor scales was to prevent mood awareness or compliance effects. On the first page participants were asked to tick a box indicating their sex and to write their age in years. They were then asked to mark a position on a *relaxed/tense* practice rating scale.

Procedure

After reading information about the experiment, having questions answered and completing a consent form, each participant was tested alone in a sound attenuated room with controlled lighting level (Schwarz & Clore, 1983), while seated at a desk at a distance of 1.5 metres from a television screen. It was explained that factors such as attention and relaxation levels influence the extent of attitude change and that, after completing a questionnaire, participants would be encouraged to relax and at various

times asked to answer questions “relating to attention level and so on”. Participants were told that the study would involve (*whichever one applied in their case*): presentation of music, video track, combined music and video, *or* an autobiographical task, to which they were asked to attend carefully. Participants were naive as to the mood-inducing intention of the experiment until the debriefing at its conclusion.

Each participant was asked to complete a social cognition questionnaire: the shorter version of the need for cognition scale. Participants were then encouraged to relax. This was in order to standardise levels of physiological arousal (cf. Clark, Milberg & Erber, 1987; Revelle & Loftus, 1990) and involved a few minutes of abdominal breathing followed by an exercise in tensing and relaxing of the hands. Participants were then asked to breathe slowly and to allow the whole body to let go and to relax.

The first mood ratings were then completed to provide a baseline measure of mood. Sad (1) was the lowest possible score and (9) happy the highest. Three ten-minute mood inductions, of happy, neutral and sad valence, were then presented in counterbalanced order. After each induction, mood ratings were again completed. All mood inductions were of the same type (audio only, visual only, audiovisual or autobiographical) and presented with only sufficient time between them to allow for the completion of the rating.

At the conclusion of the experiment, participants had the purpose of the study, and the nature of their particular mood manipulation, explained to them. Those who had received a sad mood induction were offered the opportunity of viewing the audiovisual happy mood induction.

Results

The need for cognition (Nc) score had an overall mean, $M = 13.11$ ($SD = 3.49$). The scores ranged from 3 to 18, where $Nc = 0$ would indicate the lowest possible need for cognition and $Nc = 18$ the highest possible.

As a validation check, the ratings made prior to mood inductions (baseline) were correlated for the sad - happy scale with the other scales amongst which it was embedded. There were only two significant correlations. Over the 48 participants, ($df = 46$, two-tailed test) there was a highly significant correlation between the ratings given on the sad - happy scale with those for the depressed - elated scale ($r = .66$). There was also a significant, although smaller, correlation between the ratings on the sad - happy scale with the lethargic - energetic scale ($r = .29$).

An alpha level of .05 was used for all statistical tests. All F -tests involving more than two repeated measures had p -values corrected using the Geisser-Greenhouse correction for non-homogeneity of variance.

The results are shown in Figure 6.1, which shows the change in mood for each of the induction methods for each of the intended mood types. Mood rating change was measured for each of the mood types in terms of their difference from the preceding induction by subtracting the previous mood rating from current rating, giving rise to three categories (*happy - preceding mood*, *neutral - preceding mood*, *sad - preceding mood*).

A 3 (Mood type) x 4 (Induction method) x 2 (Sex) ANOVA, where mood type was within subjects, and induction method and sex were between subjects factors, and the dependent variable was mood rating change, showed a significant main effect for mood type, $F(2,80) = 15.18$, $p < .001$. There was a significant interaction between mood type

and induction method, $F(6,80) = 2.66$, $p = .021$. There were no significant effects involving sex. Preliminary studies had ruled out the experimental situation and the relaxation process as affecting mood.

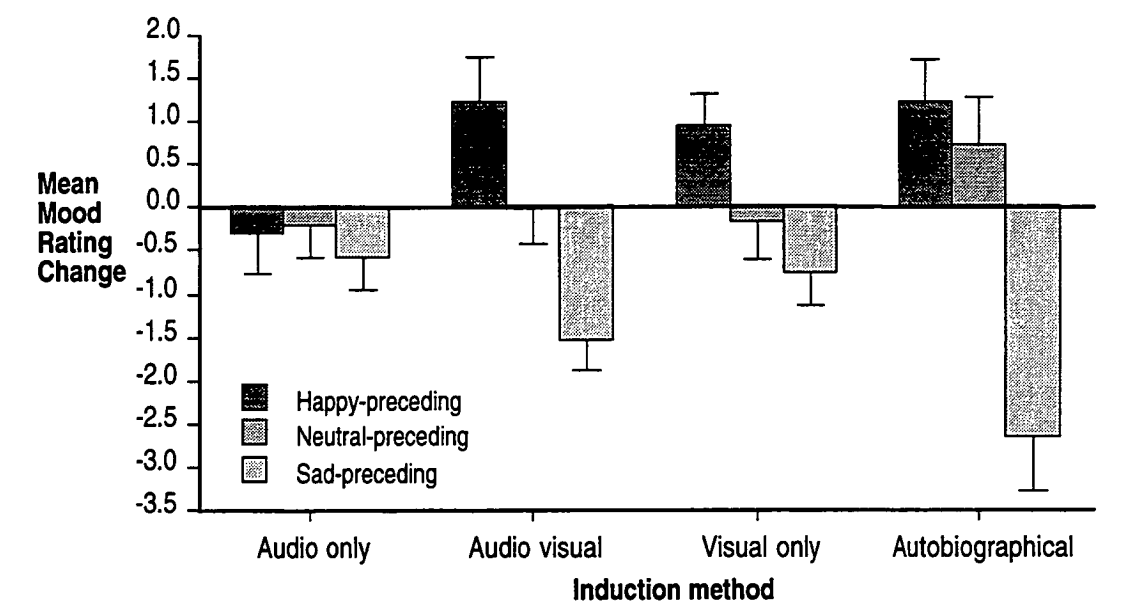


Figure 6.1 Change in mean mood ratings for each of the mood induction methods. Vertical lines depict standard errors of the means.

Separate ANOVAs were then performed for each induction method. These one way analyses of variance (within subjects) showed significant main effects for mood for all except the audio induction method as shown in Table 6.1. Results of contrast analyses between pairs of means are shown in Table 6.2.

Table 6.1 Results of ANOVA Performed on Induction Method

<i>induction method</i>	<i>F value</i>	<i>p-value</i>
audio	$F(2,22) = 0.20$	.724
visual	$F(2,22) = 3.69$	.043*
audiovisual	$F(2,22) = 7.99$	.005*
autobiographical	$F(2,22) = 9.97$	.001*

Note. p -value adjusted using the Geisser-Greenhouse correction.
 * Significant at $p = .05$.

Table 6.2 Contrast Analyses for Mean Ratings of Participants in Happy, Neutral and Sad Mood Groups.

<i>induction method</i>	<i>Happy vs. Sad</i>		<i>Sad vs. Neutral</i>		<i>Happy vs. Neutral</i>	
	<i>F value</i>	<i>p-value</i>	<i>F value</i>	<i>p-value</i>	<i>F value</i>	<i>p-value</i>
<i>audio</i>	$F(1,11) = 0.19$	.560	$F(1,11) = 0.38$	.459	$F(1,11) = 0.03$	.752
<i>visual</i>	$F(1,11) = 7.14$	.015*	$F(1,11) = 0.85$	.364	$F(1,11) = 3.07$	.095
<i>audiovisual</i>	$F(1,11) = 15.92$	.001*	$F(1,11) = 4.78$	.047*	$F(1,11) = 3.25$	.093
<i>autobiographical</i>	$F(1,11) = 16.86$	.001*	$F(1,11) = 12.75$	.002*	$F(1,11) = 0.29$	.583

Note. *p*-value adjusted using the Geisser-Greenhouse correction.

* Significant at $p = .05$.

For happy compared with sad mood ratings, significant differences were found for all induction methods except the audio. For sad compared with neutral mood ratings, significant differences were found for audiovisual and autobiographical induction methods. However significant differences between happy and neutral mood ratings were more problematic – mean differences failed to reach significance for any of induction methods, although audiovisual and visual methods resulted in most separation between these moods.

Matched pairs t-tests (one-tailed) were used to ascertain whether the changes were significantly in the predicted direction compared with the baseline (taking into account preceding mood). The hypotheses were that participants subjected to happy mood inductions would make mood ratings significantly higher than baseline ratings, that participants subjected to sad mood inductions would make mood ratings significantly lower than baseline ratings and that participants subjected to neutral mood inductions would make mood ratings not significantly different from baseline ratings. The results are shown in Table 6.3, which shows that these hypotheses were upheld for visual-only, audiovisual and autobiographical induction methods, but not for the audio-only method.

As seen in Figure 6.1 the autobiographical method used in this experiment produced greatest separation between happy and sad moods. The audiovisual method used

produced the most nearly symmetrical separation between the three moods. As the sad - happy scale was on ordinal scale these conclusions have indicative value only.

Table 6.3 Results of Matched-pairs *t*-tests (one tailed) Showing Differences between Measurements of Induced Mood and Preceding Mood

<i>Induced mood</i>	<i>Happy</i>		<i>Neutral</i>		<i>Sad</i>	
	<i>t value</i>	<i>Mean (SD)</i>	<i>t value</i>	<i>Mean (SD)</i>	<i>t value</i>	<i>Mean (SD)</i>
<i>audio</i>	-0.74	-0.325 (1.519)	-0.56	-0.217 (1.330)	-1.61	-0.592 (1.272)
<i>visual</i>	2.62*	0.933 (1.235)	-0.44	-0.192 (1.657)	-1.99*	-0.783 (1.220)
<i>audiovisual</i>	2.25*	1.208 (1.858)	-0.11	-0.042 (1.346)	-5.23*	-1.558 (1.196)
<i>autobiographical</i>	2.44*	1.217 (1.730)	1.29	0.708 (1.908)	-4.31*	-2.683 (2.156)

Note. $p = .05$ at $t = \pm 1.79$; $df = 11$

* Significant at $p = .05$.

Discussion

Across all mood induction types combined, the scores for the sad - happy scale correlated significantly with the depressed - elated scale. The only other scale which correlated significantly, although to a much smaller extent, with the ratings for the sad - happy scale was the lethargic - energetic scale. These results support the construct validity of the sad - happy scale.

Differential results were produced for sad/happy mood. The combined effect of audiovisual as compared with separate audio and visual inductions was apparently additive for sad mood, but in the case of happy mood the audio plus visual effect might have been entirely due to the visual component. Also, the audiovisual induction, in requiring attention to both auditory and visual stimuli, is less likely to have been subject to mood-incongruent thoughts than audio and visual separately. The visual induction itself might occupy more attention than the audio-only. Since the video and audio stimulus channels were not related in content, participants would be led to select between them. This might well have led to a much greater proportion of attention being

directed at the visual stimulus, especially when visual stimuli are inherently more attention-provoking.

Of the mood induction methods trialed, the visual-only, audiovisual and autobiographical methods were found to be effective in inducing happy and sad moods. The finding that audio stimuli (music) did not result in the required mood ratings is consistent with the findings of Fiedler (1991). Martin (1990) listed music, and also autobiographical recall, solitary recollection and film, as inducing required mood in 75% of cases. However, she indicated that participants were also requested to use any other effective means to develop mood, and therefore, in the research findings she reviewed, music was not isolated as being solely responsible for a high success rate.

As regards the induction of a neutral mood, only audiovisual and autobiographical inductions resulted in significant differences between sad and neutral moods and none of the stimuli resulted in significant differences between happy and neutral moods.

In summary, the non-verbal audiovisual mood induction trialed was found to be a satisfactory alternative to the autobiographical induction for inducing happy and sad moods.

Chapter 7

Experiments 2, 3 and 4: Mood Influence on Health Judgments

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According to Forgas's (1994a) Affect Infusion Model for social judgments, people in a sad mood should take longer to process health-relevant information and be more pessimistic about both the possibility and the outcome of modifying their behaviour, than those in a happy mood.

Experiment 2 was designed to test this prediction across a spectrum of health related behaviours: alcohol, nicotine and cannabis use, exercise, fat, fruit and vegetable consumption, ultraviolet exposure and safer sexual practices, in people with happy, neutral and sad moods. These moods were induced in the laboratory by non-verbal material (10 minutes of selected video-track with music) developed in the experiment described in Chapter 6. Thirty males and thirty females were first assessed for self-esteem and need for cognition in preparation for the originally planned studies on persuasive messages (see Chapter 5). Mood was induced and pre- and post-induction mood ratings were made on 9-point scales embedded between distractor items to prevent mood awareness or compliance effects. After presentation of health-relevant information, participants indicated their current behaviour, made risk assessments, indicated their perceived chances of modifying their behaviour and estimated the outcome of such change. All questionnaires and responses for Experiment 2 were dealt with via computer.

Because mood effects were not sufficiently strong in Experiment 2, Experiment 3 used an autobiographical mood induction to replace the audiovisual. Mood effects were still not evident and therefore a third study, Experiment 4 involved the substitution of pencil-and-paper for the computer-administered testing of Experiments 2 and 3. Experiment 4 involved 30 females, with a further 14 females again responding via

computer and functioning as a control group. For this experiment mood inductions were again audiovisual.

Hypotheses for Experiments 2, 3 and 4

First hypothesis

If Forgas's model applies to health judgments then participants in whom a sad mood is induced will make more pessimistic judgments about both the possibility and the outcome of modifying their behaviour; and those in whom a happy mood is induced will more make more optimistic judgments (with neutral mood in between).

Second hypothesis

If Forgas's model applies to health judgments then participants in whom a sad mood is induced will have a longer processing time; and those in whom a happy mood is induced will have a shorter processing time (with neutral mood in between).

Separate predictions are made on the basis on the basis of Forgas's model and each of these predictions was tested by appropriate analysis of variance.

Experiment 2: Audiovisual Mood Induction and Computer-administered Items

Method

Participants

Sixty first-year Psychology students, 30 males and 30 females, of mean age, $M = 24.87$ years ($SD = 9.02$) were recruited to participate in an experiment described as a social judgment study.

Design

A 2 x 3 between subjects factorial design was used, with factors (and levels), sex (male, female) and mood induction (happy, neutral, sad). Dependent variables were perceived risk, perceived chance of modifying behaviour, estimated outcome of such behavioural modification, and response time.

Mood induction and manipulation checks

Moods were induced by the audiovisual method described in Chapter 6. Mood assessments were made before and after the mood induction, and at the end of the experiment (cf. Bohner, Chaiken & Hunyadi, 1994). Participants made ratings on a sad - happy scale with 9 major points, embedded among distractor scales and other items, which were different for each of the three assessments. (These scales were identical with pencil-and-paper formats, and can be found in Appendix B). The effectiveness of mood manipulation and maintenance was analysed using a 3 (Occasion) x 3 (Mood) x 2 (Sex) design, where occasions were: pre-induction (*pre*), post-induction (*post*) and end of experiment (*end*).

Apparatus and materials

An IBM compatible 386SX computer running Visual Basic for Windows was used to administer questionnaires, to record responses and to measure response times.

Participants made their responses using a mouse. The first computer screen asked for the participant's name and presented practice items so that participants could write answers, respond *Y* or *N* (for yes or no) in a box and make a rating by clicking on a button, or on a scale. Preliminary questionnaires used were a self-esteem inventory (Marsh, 1991, Self Description Questionnaire III: Subscale for the General Self) and a need for cognition scale (NCS) - short form (Cacioppo, Petty & Kao, 1984). Copies of protocols for this experiment form Appendix B. Questionnaires were scored as recommended by their respective authors.

Confidence and expectancy items consisted of items on various health topics, and were of the form:

Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?

What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?

Mood induction videos were presented on a 34 cm television set. Videos were those with audiovisual content described in Chapter 6. That is, sound tracks were derived from different musical sources (happy: various Scott Joplin tracks, neutral: Richard Clayderman's *A Dream of Love*, sad: some *Elegaic Melodies* of Edvard Grieg) all of which were free of verbal content. Visual tracks were edited from happy, neutral and sad portions of the film *The Gods must be Crazy*, with the sound track removed.

Procedure

Each participant was tested alone. After participants had read and signed a consent form, all work except for the mood inductions was undertaken at the computer.

When participants were seated at the computer, they were presented with the following as constituting the first experiment. After some experience using the computer for practice examples they completed the self-esteem inventory and need for cognition scale (short form). The first mood assessment was then made, after which participants were seated at a desk in front of a video-player and monitor, to experience their assigned mood induction: happy, neutral or sad. They were then asked to return to the computer. The second mood assessment followed.

Participants then proceeded with what was presented as a second experiment. Another set of practice examples appeared on the screen but participants were told that there was “no need to do that again because you’ve already done that for the first experiment”. Confidence and expectancy ratings were then made. A third mood assessment and a post-experimental awareness questionnaire followed. Participants were debriefed on the use and purpose of the mood induction procedure and on the rationale of the experimental program. Those who had been induced with a sad mood were offered the opportunity to see the happy video and/or have further debriefing.

Results and Discussion

Preliminary analyses

Baseline data

Analyses of variance, all of the form, 3 (Mood induction) x 2 (Sex), confirmed that there were no prior significant differences between groups induced with happy, neutral or sad moods as regards age, self-esteem, need for cognition or facility with using the computer (ascertained by response times on need for cognition questionnaires).

Mood checks

Figure 7.1 shows mean mood ratings on the sad - happy scale for mood induction groups pre-induction, post-induction and at the end of Experiment 2. Analysis of variance on the basis of a 3 (Occasion) x 3 (Mood induction) x 2 (Sex) design showed a

significant Occasion x Mood induction interaction, $F(4,108) = 6.94$, $p = .001$ (with Geisser-Greenhouse correction). As can be clearly seen, moods were manipulated in the intended direction, but were not maintained until the end of the experiment.

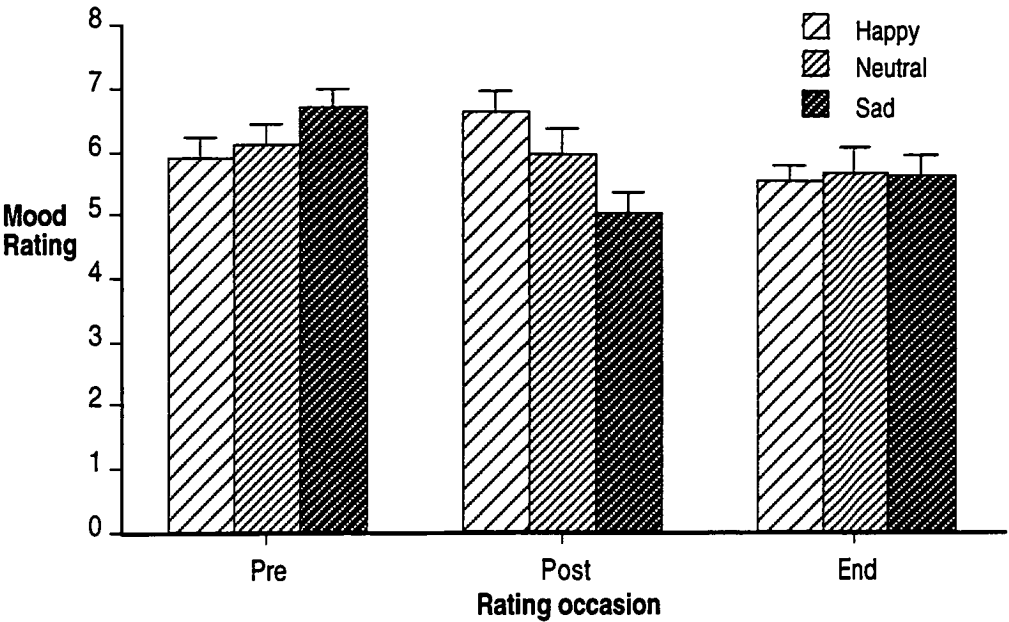


Figure 7.1 Mean mood ratings for mood induction groups, happy, neutral and sad, at pre-induction, post-induction and end of Experiment 2. Vertical lines depict standard errors of the means.

For *pre*-induction, *post*-induction and *end* of experiment, analyses of variance of the form 3 (Mood induction) x 2 (Sex) were performed on mood ratings on the sad - happy scale.

- (i) At pre-induction (*pre*) there were no significant effects, and in particular there were no significant differences between the three groups prior to the mood induction procedures,
- (ii) Immediately post-induction (*post*) there was a significant main effect for mood, $F(2,54) = 5.04$, $p = .010$, with Student-Newman-Keuls (SNK) tests showing a significant difference in mood between sad and happy groups. There were no other significant effects.
- (iii) At the end of the experiment (*end*) no significant differences remained, showing that induced mood did not persist until that stage.

It would seem therefore that any mood effects would be more likely to be found in responses to earlier rather than to later items.

Testing the major hypotheses: impact of mood on health judgments

Impact of mood on health ratings

Participants made ratings on the three aspects that follow for a range of behaviours and practices.

1. The likelihood of encountering specific problems given their current behaviour.
2. Perceived chances of modifying their current behaviour in a healthy direction.
3. The improvement they expected might result from such a change.

All participants responded to aspect 1. for all behaviours. Participants did not respond to 2. or 3. relating to alcohol use, nicotine use, or cannabis use if they were non-users of that particular substance. All participants rated 2. and 3. for the other behaviours (i.e. exercise, fat consumption, fruit and vegetable consumption, safer sexual behaviour or protection against ultraviolet radiation).

These three aspects yielded three optimism scores as dependent variables used in a 3 (Mood induction) x 2 (Sex) analyses of variance. Where necessary raw scores were reversed so that more optimistic scores would be expressed as higher ratings. Scores were:

- (i) Current prediction
- (ii) Chances of change
- (iii) Predicted change in health (expected improvement rating minus likelihood rating given current behaviour, i.e. *score on 3 - score on 1*).

Current predictions

Current prediction across all behaviours

Mean ratings, summed across all behaviours, for perceived likelihood of encountering problems in the given area of behaviour given current practice for the three mood induction methods were:

Happy	$M = 49.75$	$(SD = 9.53)$
Neutral	$M = 52.05$	$(SD = 10.46)$
Sad	$M = 54.60$	$(SD = 9.39)$

There were no significant effects. Nor were the means in the order predicted by the AIM.

Current prediction for specific behaviours

Figure 7.2 shows the means for perceived likelihood of encountering problems in the given area of behaviour given current practice.

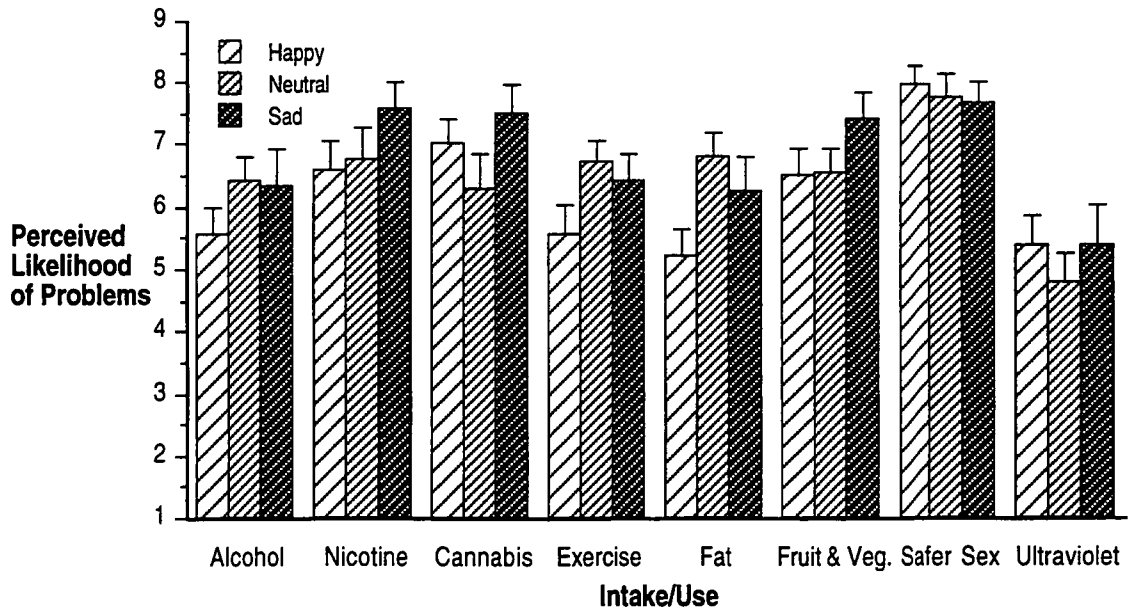


Figure 7.2 Perceived likelihood of encountering problems in the given area of behaviour, given current practice, with happy, neutral or sad mood, for Experiment 2. (N = 60.) Vertical lines depict standard errors of the means.

Exploratory analyses of variance indicated no significant effects involving mood for any of the behaviours investigated. Effects for sex were found for nicotine and exposure to ultraviolet radiation.

For nicotine, mean rating by females was $M = 7.70$ ($SD = 1.73$), and for males $M = 6.27$ ($SD = 2.29$) and these were significantly different, $F(1,54) = 7.45$, $p = .009$. That is, females rated themselves as less likely to have problems resulting from their current and previous nicotine use than did males.

For exposure to ultraviolet radiation, mean rating by females was $M = 6.00$ ($SD = 2.15$), and that of males $M = 4.40$ ($SD = 2.39$) and these were significantly different, $F(1,54) = 7.17$, $p = .010$. Females predicted fewer problems resulting from their current behaviour than did males.

In summary, although the AIM predicts that participants induced with a sad mood would make more pessimistic ratings than those induced with a happy mood, this experiment found no evidence for such an effect with the *Current prediction* variable.

Because alcohol, nicotine and cannabis were used by only some participants, the *Chances of change* and *Predicted change* measures dealt with next included only scores of users of these drugs. The other behaviours were common to all participants and were therefore rated by all of them.

Chances of change

Chances of change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for chances of change in behaviour given current practice for the three induced mood types were:

Happy	$M = 36.20$	$(SD = 4.69)$
Neutral	$M = 34.25$	$(SD = 5.31)$
Sad	$M = 36.00$	$(SD = 5.57)$

These mean ratings were not significantly different from each other and therefore failed to support the AIM. There was a significant interaction between mood induction and sex, $F(2,54) = 3.97, p = .025$. This is illustrated in Figure 7.3 and shows a tendency for males in a sad mood to rate themselves as less likely to be able to change their behaviour than did females, whereas participants of both sexes induced with happy and neutral moods, responded similarly. Means comparisons (contrast analysis) indicated significant differences in scores between neutral females and sad females ($p = .011$) and between sad males and sad females ($p = .004$).

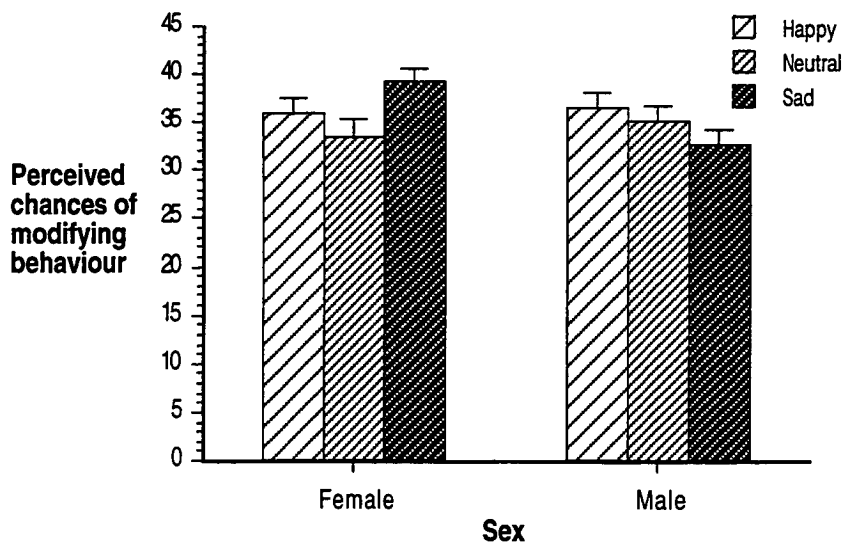


Figure 7.3 Interaction between induced mood and sex for chances of modifying behaviour (summed ratings from exercise to UV protection) with happy, neutral or sad mood. Vertical lines depict standard errors of the means.

Chances of change for specific behaviours

Figure 7.4 shows mean perceived chance of successfully modifying behaviour in the given area given a decision to do so.

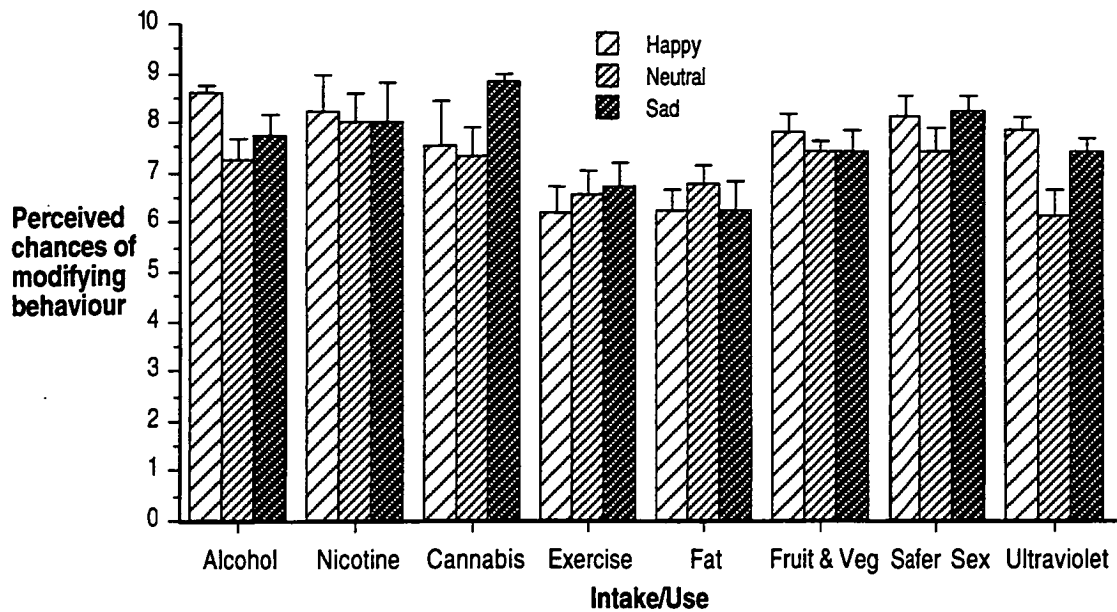


Figure 7.4 Perceived chances of successfully modifying behaviour in the given area given a decision to do so with happy, neutral or sad mood, for Experiment 2. (Alcohol, $N = 53$; nicotine, $N = 14$; cannabis, $N = 16$; others, $N = 60$.) Vertical lines depict standard errors of the means.

Exploratory analyses of variance showed no significant effects involving mood or sex, for nicotine (for those who smoked), cannabis (for users), exercise, or safer sex.

For users of alcohol, there was a main effect for mood, $F(2,47) = 3.72$, $p = .032$, with the happy group being the most optimistic about the chances of change, $M = 8.59$ ($SD = 0.62$), followed by the sad group, $M = 7.72$ ($SD = 1.87$), with the neutral group being the least optimistic about their chances of reducing their alcohol intake, $M = 7.28$ ($SD = 1.71$). SNKs showed that only the mean scores of the happy and neutral groups were significantly different from each other.

For fat intake, there was a significant interaction between mood and sex, $F(2,54) = 3.68$, $p = .032$. Figure 7.5 shows sad males to be more pessimistic about their chances of modifying their behaviour than sad females. Means comparisons (contrast analysis) indicated this difference to be statistically significant ($p = .003$). The only

other significant differences between means were between sad males and neutral males ($p = .034$), and between sad males and neutral females ($p = .044$).

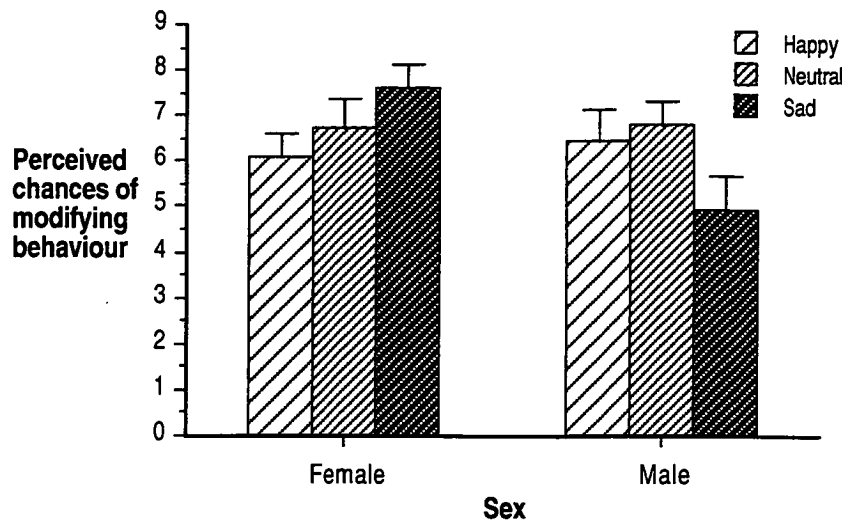


Figure 7.5 Interaction between induced mood and sex for chances of modifying behaviour (fat intake) with happy, neutral or sad mood. Vertical lines depict standard errors of the means.

For fruit and vegetable consumption, there was a significant effect for sex, $F(1,54) = 5.65$, $p = .021$, with females rating themselves as having a greater chance of modifying their fruit and vegetable intake than did males. Mean scores were males: $M = 7.07$ ($SD = 1.87$), and females: $M = 8.00$ ($SD = 1.08$).

For exposure to ultraviolet radiation, there was a significant effect for mood, $F(2,54) = 5.43$, $p = .007$, with participants in whom a happy mood had been induced rating their chances of reducing their exposure most likely (mean rating $M = 7.85$ ($SD = 1.14$)), followed by the sad mood group (mean rating $M = 7.40$ ($SD = 1.39$)) and then the neutral mood group (mean rating $M = 6.15$ ($SD = 2.25$)). SNKs showed significant differences between scores of the happy and neutral groups and also between sad and neutral groups.

Predicted change

Predicted change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for predicted change in behaviour given current practice for the three mood induction methods were:

Happy	$M = 3.95$	$(SD = 3.86)$
Neutral	$M = 2.00$	$(SD = 3.29)$
Sad	$M = 3.00$	$(SD = 4.95)$

Although the means for happy and sad (but not neutral) were in the predicted order, analysis of variance indicated no significant effects.

Predicted change for specific behaviours

Figure 7.6 shows means for predicted change in health resulting from a behaviour change in the given area.

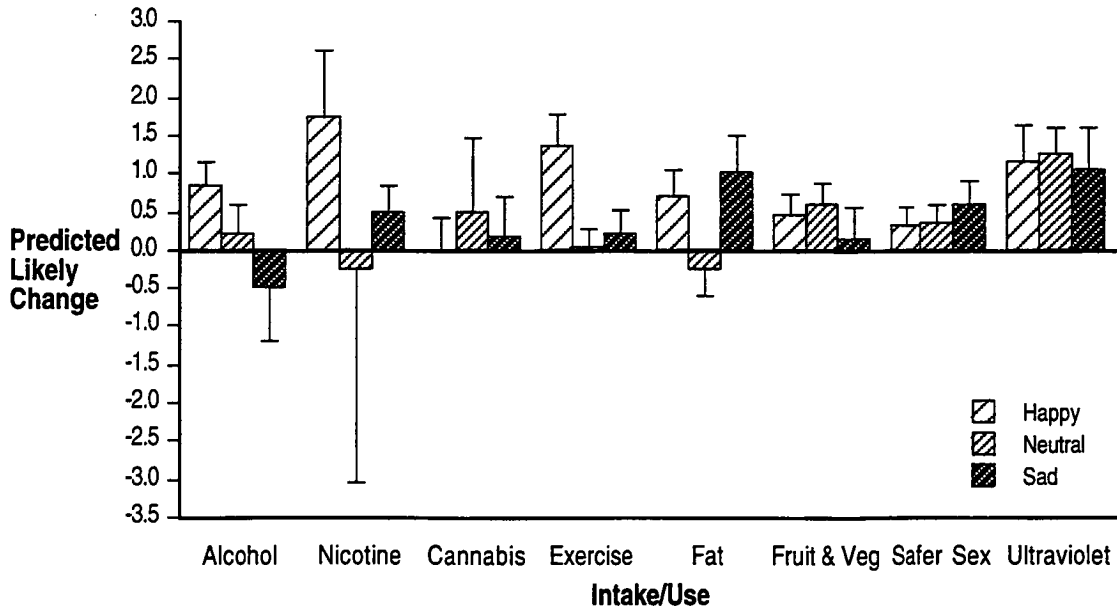


Figure 7.6 Predicted change with happy, neutral or sad mood, for Experiment 2. (Alcohol, $N = 53$; nicotine, $N = 14$; cannabis, $N = 16$; others, $N = 60$.) Vertical lines depict standard errors of the means.

Exploratory analyses of variance showed no significant effects involving mood or sex for alcohol (for users), nicotine (for smokers), cannabis (for users), fat consumption, fruit and vegetable consumption, safer sex or exposure to ultraviolet radiation.

There was a significant effect for mood on predicted change in health with exercise, $F(2,54) = 4.45, p = .016$. In this instance, the predictions of participants induced with happy and sad moods were in accord with the AIM and indeed SNK tests showed that the mean scores (as depicted in Figure 7.6) for happy and sad mood groups were significantly different from each other. The scores for neutral and happy groups were also significantly different although the position of neutral scores was not as predicted by the AIM.

Impact of mood on processing time

Impact of mood on processing time across all behaviours

When response time was summed across all ratings (other than for alcohol, nicotine and cannabis use), mean response times (in seconds) for each induction method were:

Happy	$M = 172.10$	$(SD = 44.04)$
Neutral	$M = 187.50$	$(SD = 38.25)$
Sad	$M = 194.65$	$(SD = 47.21)$

These response times were in the predicted order, but a 3 (Mood induction) x 2 (Sex) ANOVA showed no significant main effects or interactions.

Impact of mood on processing time for specific behaviours

Figure 7.7 shows mean response times for each item for each of the three moods. In the case of alcohol, nicotine and cannabis, response times are given only for users.

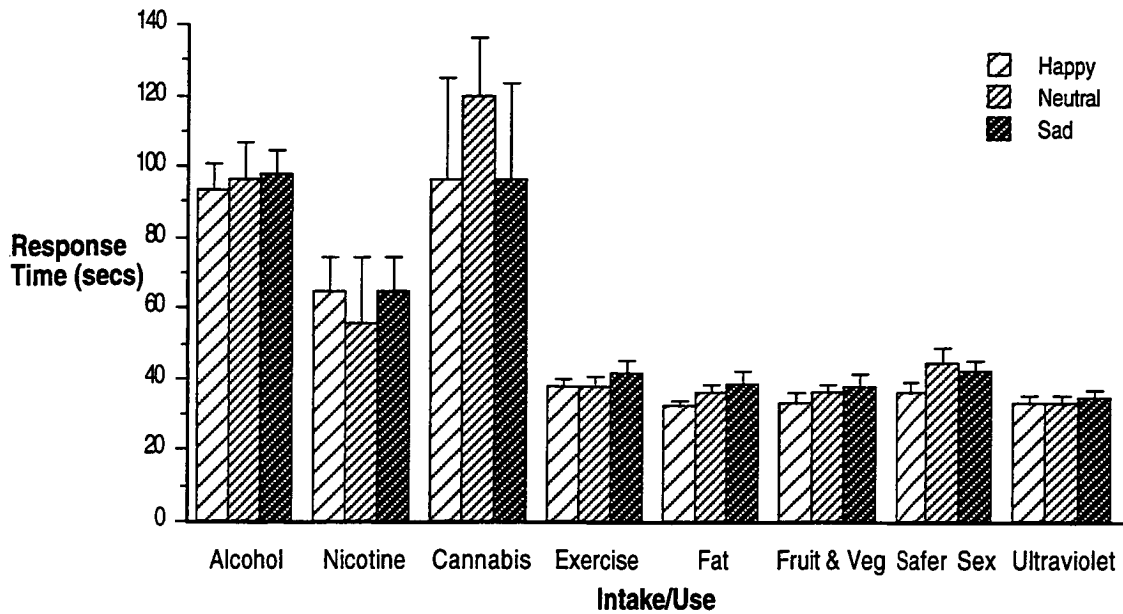


Figure 7.7 Response times with happy, neutral or sad mood, for Experiment 2. (Over 5 items relating to alcohol, 6 to nicotine and 6 to cannabis; 3 items for each of the others. Alcohol, $N = 53$; nicotine, $N = 14$; cannabis, $N = 16$; others, $N = 60$.) Vertical lines depict standard errors of the means.

A 3 (Mood induction) \times 2 (Sex) ANOVA for users only of alcohol, nicotine or cannabis, in confidence and expectancy ratings in these behaviours, and for all participants for exercise, fat consumption, fruit and vegetable consumption, safer sexual behaviour or protection against ultraviolet radiation, showed no significant main effects or interactions.

That is, the hypothesis that people in whom a sad mood had been induced would take longer to process information than those in whom a happy mood had been induced was not upheld.

A summary of findings related to mood in terms of number of participants, N , and p -values, is given in Table 7.1.

Table 7.1 Summary of Mood Main Effects in Experiment 2.

<i>Preliminary analyses</i>	<i>N</i>	<i>p</i>				
<i>Age</i>	60	.538				
<i>Mood before inductions</i>	60	.177				
<i>Mood after induction</i>	60	.010 *				
<i>Final mood (end of experiment)</i>	60	.947				
		<i>p-values</i>				
<i>Main analyses</i>		<i>RT</i>	<i>Opt 1</i>	<i>Opt 2</i>	<i>Opt 3</i>	
<i>Sum of analyses with 60 participants</i>	60	.257	.288	.394	.307	
<i>Alcohol</i>	60	n/a	.363	n/a	n/a	
<i>Alcohol</i>	53 drinkers only	.928	n/a	.032 *	.164	
<i>Nicotine</i>	60	n/a	.254	n/a	n/a	
<i>Nicotine</i>	14 smokers only	.897	n/a	.931	.654	
<i>Cannabis</i>	60	n/a	.206	n/a	n/a	
<i>Cannabis</i>	16 cannabis users only	.763	n/a	.191	.779	
<i>Exercise</i>	60	.507	.142	.775	.016 *	
<i>Fat items</i>	60	.235	.065	.649	.072	
<i>Fruit & veg. intake</i>	60	.447	.265	.633	.630	
<i>Safer sex</i>	60	.270	.828	.355	.699	
<i>UV</i>	60	.815	.641	.007 *	.958	

Note. * significant at $p = .05$

Variables: Mood type (Happy, Neutral, Sad), Sex (Male, Female)

Key: RT: Response time
 Opt 1: Optimism score (first) i.e. Prediction, given current behaviour (negative optimism score)
 Opt 2: Optimism score (second) i.e. Chances of change
 Opt 3: Optimism score (third) i.e. Predicted change in health, given behavioural change
 n/a not available/applicable

Correlations

Because ambient mood might be more pervasive than induced mood, correlational analyses were run between final mood and optimism ratings (cf. Salovey & Birnbaum, 1989) and between mood and processing time. The results are included in the summary Table 7.2. These analyses showed a negative correlation between mood after manipulation and predicted problems from current behaviour across all health behaviours, and a negative correlation between mood after manipulation and chances of health related changes across all applicable ratings, opposite from the predictions of the AIM. Interestingly, but perhaps not surprisingly, self-esteem correlated significantly with pre-induction and with post-experimental mood, but not with post-induction mood.

Table 7.2 Correlations for Experiment 2

	1.	2.	3.	4.	5.	6.	7.	8.
1. <i>Pre Mood</i>	1							
2. <i>Post Mood</i>	.28*	1						
3. <i>Final Mood</i>	.57*	.49*	1					
4. <i>Self Esteem</i>	.59*	.03	.37*	1				
5. <i>Problems (Alc to UV)</i>	.15	-.31*	.04	.08	1			
6. <i>Chances (Ex to UV)</i>	.17	-.21*	-.03	.21*	.39*	1		
7. <i>Pred. Change (Ex to UV)</i>	-.19	.02	-.07	-.15	-.41*	-.07	1	
8. <i>RT (Ex to UV)</i>	.01	.09	.14	-.04	.06	-.10	-.21	1

Note: $df = 58$; critical value of $r = .21$.

* Significant at $p = .05$.

Post-experimental questionnaires, administered to check for any anomalies to be taken into consideration in analyses or modifications required for future studies, yielded no significant information. For example, no participants expressed any suspicion about a connection between the allegedly unrelated ‘first’ and ‘second’ experiments.

Summary

First hypothesis

Although mood was successfully induced, ANOVAs across all three optimism ratings showed few effects at all for mood even for earlier items. Therefore there was little evidence in support of the first hypothesis – that participants in whom a sad mood had been induced would make more pessimistic judgments about both the possibility, and the outcome, of modifying their behaviour, and those with a happy mood would make more optimistic judgments.

Second hypothesis

Nor was there support for the second hypothesis that participants in whom a sad mood was induced would have a longer processing time than those in a happy mood (with neutral mood between).

Correlations

Correlational analyses showed that mood correlated negatively with some health ratings and provided no support for the AIM.

Experiment 3: Autobiographical Mood Induction and Computer-administered Items

This experiment was similar to Experiment 2 except that, because of the lack of mood effects, moods were induced using a traditional autobiographical method (Baker & Guttfreund, 1993; Martin, 1990; Schwarz & Clore, 1983; Wright & Mischel, 1982).

Method

Participants

Sixty first-year Psychology students, 30 males and 30 females, of mean age 21.13 years ($SD = 6.93$) were recruited to participate in an experiment described as a social judgment study.

Design

The design was identical to that of the Experiment 2.

Mood induction and manipulation checks

Mood was induced by the autobiographical method described in Chapter 6. Mood assessments were as for Experiment 2. As before, effectiveness of mood manipulation and maintenance was analysed using a 3 (Occasion) x 3 (Mood) x 2 (Sex) design, where occasions were: pre-induction (*pre*), post-induction (*post*) and end of experiment (*end*).

Apparatus and materials

Apparatus and materials were as for Experiment 2 except for the mood induction material. In this experiment, the autobiographical method (cf. Baker & Guttfreund, 1993; Martin, 1990; Schwarz & Clore, 1983; Wright & Mischel, 1982) found successful in Experiment 1 was used. The apparatus therefore consisted of a typed set of instructions for participants to write about some of their own life experience. The

group to be induced with a happy mood was asked to write about a happy incident, and the group to be induced with a sad mood was asked to write about a sad incident. Neutral group participants were instructed to describe the street in which they had lived at the age of about 10 years. (See Appendix B.)

Participants responded using two pages of lined paper. A ten minute time period for the mood induction was measured by the experimenter with a stop-watch.

Procedure

The procedure was as for Experiment 2, except that the autobiographical induction method replaced the audiovisual. The autobiographical mood induction was carried out away from the computer.

Results and Discussion

Preliminary analyses

Baseline data

Analyses of variance, all of the form 3 (Mood induction) x 2 (Sex), confirmed that there were no significant differences between the groups to be induced with happy, neutral or sad moods, for age, self-esteem, need for cognition or facility with using the computer (ascertained by response times on need for cognition questionnaires).

Mood checks

Figure 7.8 shows mean mood ratings, on the sad - happy scale, for mood induction groups at *pre*-induction, *post*-induction and *end* of Experiment 3. Analysis of variance on the basis of a 3 (Occasion) x 3 (Mood induction) x 2 (Sex) design showed a significant Occasion x Mood type interaction, $F(4,108) = 16.16$, $p = .001$ (with Geisser-Greenhouse correction). As can be clearly seen, moods were manipulated in the intended direction, but were not maintained until the end of the experiment, as was also the case in Experiment 2.

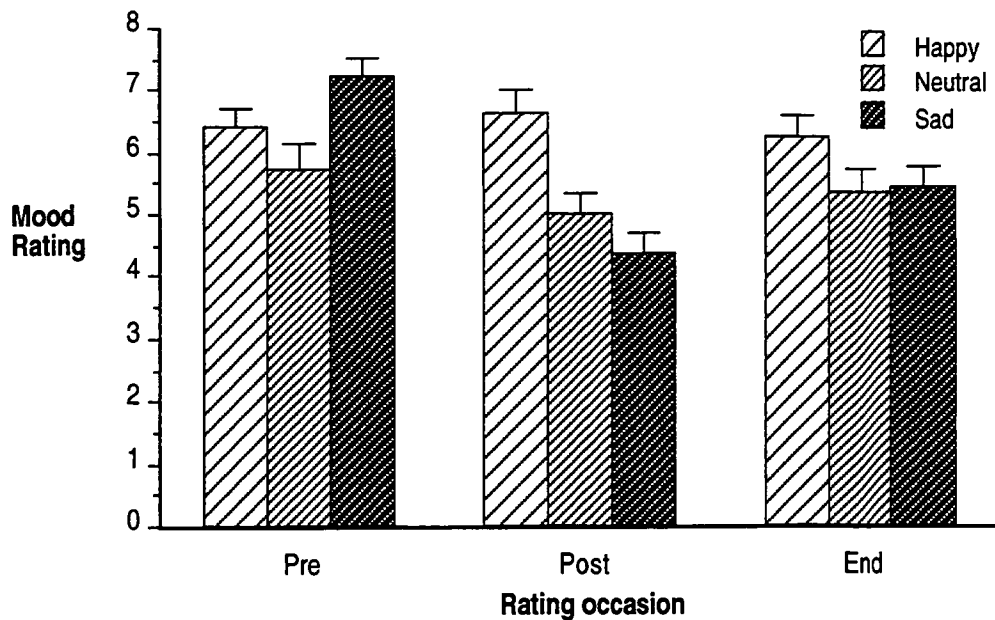


Figure 7.8 Mean mood ratings for mood induction groups, happy, neutral and sad, at pre-induction, post-induction and end of Experiment 3. Vertical lines depict standard errors of the means.

For *pre*-induction, *post*-induction and *end* of experiment, analyses of variance of the form 3 (Mood induction) x 2 (Sex) were performed on mood ratings on the sad - happy scale.

- (i) At pre-induction (*pre*) there was a significant main effect for mood, $F(2,54) = 4.40, p = .017$. SNK tests showed significant differences in mood between sad and neutral groups, with the group to be induced with a sad mood starting off happiest. Other differences were not significant.
- (ii) Immediately post-induction (*post*) there was a significant main effect for mood, $F(2,54) = 10.32, p = .001$. SNK tests showed significant differences in mood between sad and happy groups, and between neutral and happy groups. That is, the mood induction was as successful as for Experiment 2, despite the high pre-induction mood-ratings made by those allocated to the sad group.
- (iii) At the end of the experiment (*end*) no significant differences remained showing that induced mood did not persist until that stage.

It would seem therefore that any mood effects would be more likely to be found in responses to earlier rather than to later items.

Testing the major hypotheses: impact of mood on health judgments

Impact of mood on health ratings

As for Experiment 2 participants rated

1. The likelihood of specific problems given their current behaviour.
2. Perceived chances of modifying their current behaviour in a healthy direction.
3. The improvement they expected might result from such a change.

This yielded three optimism scores as dependent variables. Where necessary raw scores were reversed so that more optimistic scores would be expressed as higher ratings.

Scores were:

- (i) Current prediction
- (ii) Chances of change
- (iii) Predicted change in health (expected improvement rating minus likelihood rating given current behaviour, i.e. *score on 3 - score on 1*).

Current predictions

Current prediction across all behaviours

Mean ratings, summed across all behaviours, for perceived likelihood of encountering problems in the given area of behaviour given current practice for the three mood induction methods were:

Happy	$M = 52.70$	$(SD = 9.45)$
Neutral	$M = 50.00$	$(SD = 8.28)$
Sad	$M = 50.80$	$(SD = 12.94)$

The means for happy and sad moods (but not for neutral) were in the predicted order but analysis of variance indicated no significant differences between these ratings. Nor were there other significant effects.

Current prediction for specific behaviours

Figure 7.9 shows the mean perceived likelihood of encountering problems in the given area of behaviour, given current practice.

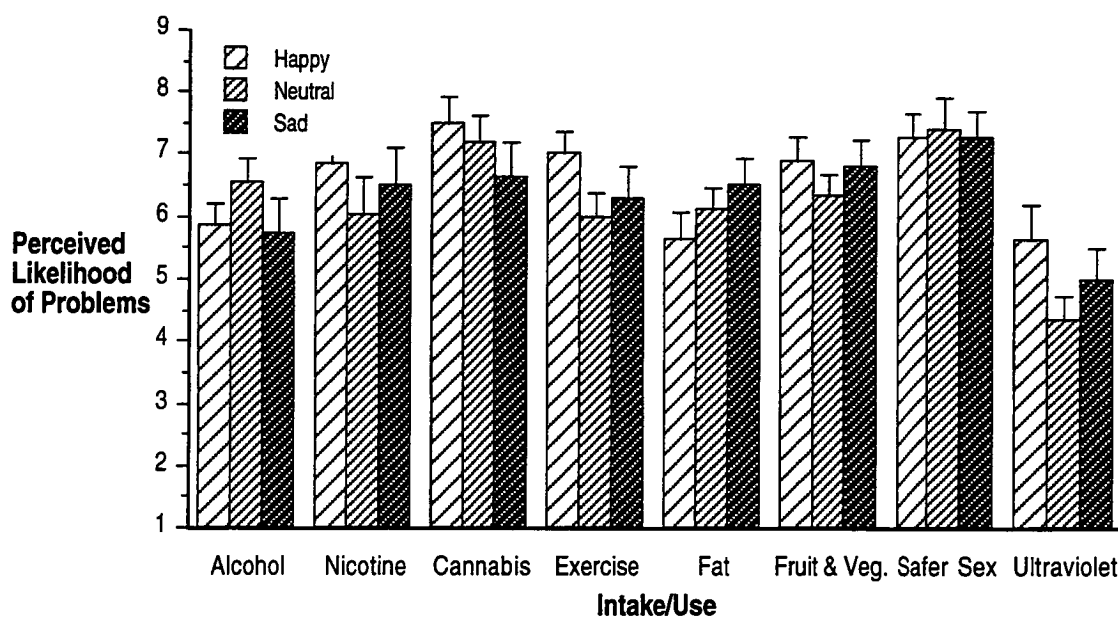


Figure 7.9 Perceived likelihood of encountering problems in the given area of behaviour, given current practice with happy, neutral or sad mood, for Experiment 3. ($N = 60$.) Vertical lines depict standard errors of the means.

There were no significant effects involving mood or sex, for alcohol, nicotine, cannabis, exercise, fat consumption, safer sex or exposure to ultraviolet radiation.

For fruit and vegetable consumption the only significant effect was for sex, $F(1,54) = 10.27$, $p = .002$, with females rating themselves as more likely to have problems resulting from their consumption level than males. Mean scores were: females, $M = 7.37$ ($SD = 1.27$); males, $M = 6.00$ ($SD = 1.89$). There were no significant mood effects.

Chances of change

Chances of change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for chances of change in behaviour given current practice for the three mood induction methods were:

Happy	$M = 35.20$	$(SD = 6.39)$
Neutral	$M = 36.55$	$(SD = 4.31)$
Sad	$M = 36.35$	$(SD = 5.09)$

The mean ratings were not in the predicted order, and analysis of variance indicated no significant differences between them, $F(2,54) = 0.37$, $p = .692$. Nor were there any other significant effects.

Chances of change for specific behaviours

Figure 7.10 shows the mean perceived chances of successfully modifying behaviour in the given area given a decision to do so.

There were no significant effects involving mood or sex for alcohol (for users) cannabis (for users), exercise, fat consumption, fruit and vegetable consumption, safer sex or exposure to ultraviolet radiation.

For those who used nicotine, there was a significant effect for sex, $F(1,16) = 5.29$, $p = .035$, with females rating themselves as more likely to be able to reduce their use than males, mean ratings by females were $M = 6.83$ ($SD = 1.75$), and by males, $M = 4.80$ ($SD = 2.04$). There were no significant mood effects.

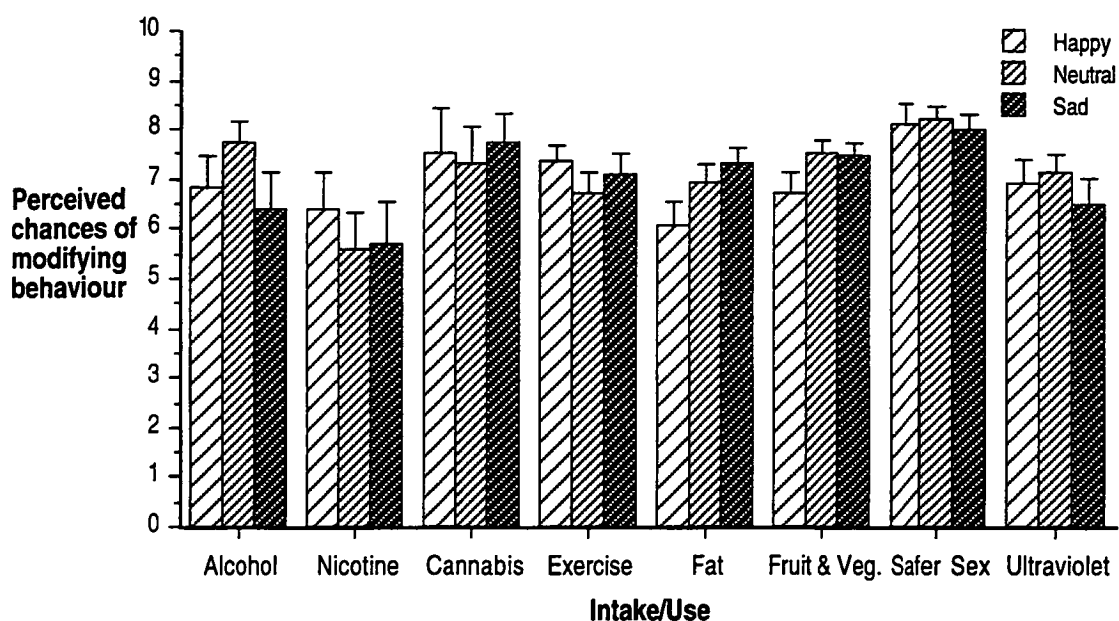


Figure 7.10 Perceived chances of successfully modifying behaviour in the given area given a decision to do so with happy, neutral or sad mood, for Experiment 3. (Alcohol, $N = 49$, nicotine, $N = 22$; cannabis, $N = 23$; others, $N = 60$.) Vertical lines depict standard errors of the means.

Predicted change

Predicted change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for predicted change in behaviour given current practice for the two mood induction methods were:

Happy	$M = 3.40$	$(SD = 5.24)$
Neutral	$M = 4.20$	$(SD = 4.58)$
Sad	$M = 2.80$	$(SD = 5.98)$

The means for happy and sad (but not neutral) were in the order predicted by the AIM but analysis of variance indicated no significant effects, $F(2,54) = 0.34, p = .712$.

Predicted change for specific behaviours

Figure 7.11 shows means for predicted change in health resulting from a behaviour change in the given area.

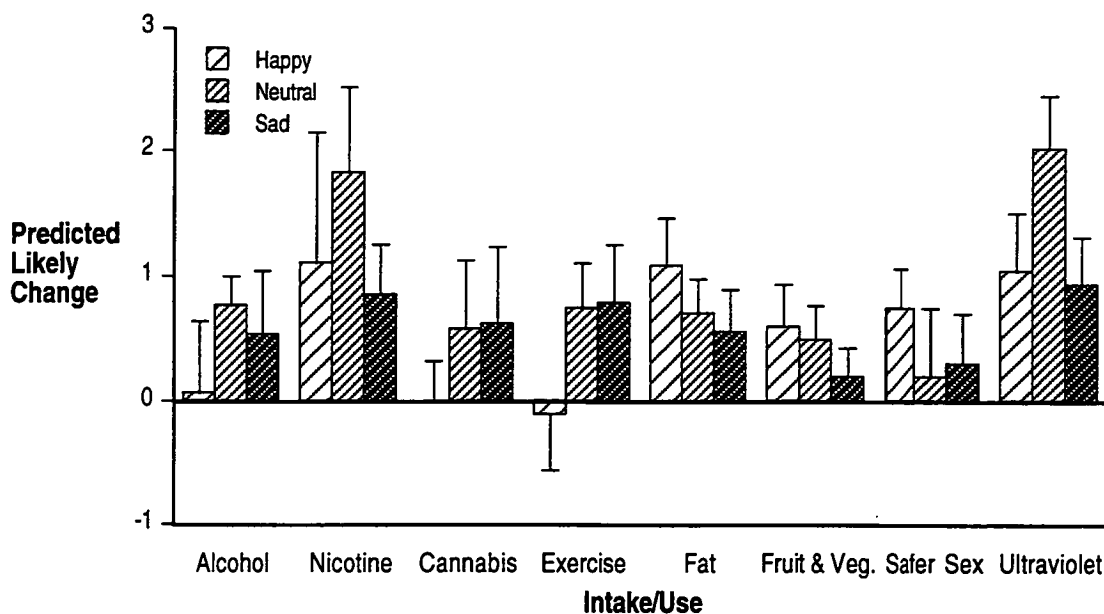


Figure 7.11 Predicted change with happy, neutral or sad mood, for Experiment 3. (Alcohol, $N = 49$; nicotine, $N = 22$; cannabis, $N = 23$; others, $N = 60$.) Vertical lines depict standard errors of the means.

There were no significant effects involving mood or sex, for any of the investigated behaviours.

Impact of mood on processing time

Impact of mood on processing time across all behaviours

When response time was summed across all ratings (other than for alcohol, nicotine and cannabis use), mean response times (in seconds) for each induction method were:

Happy $M = 182.75$ ($SD = 48.19$)

Neutral $M = 172.80$ ($SD = 35.72$)

Sad $M = 173.55$ ($SD = 36.59$)

These response times were not in the predicted order. A 3 (Mood induction) \times 2 (Sex) ANOVA showed no significant main effects or interactions, $F(2,54) = 0.37$, $p = .692$.

Impact of mood on processing time for specific behaviours

Figure 7.12 shows the mean response times for the behaviours with the three moods. In the case of alcohol, nicotine and cannabis, response times are given only for users.

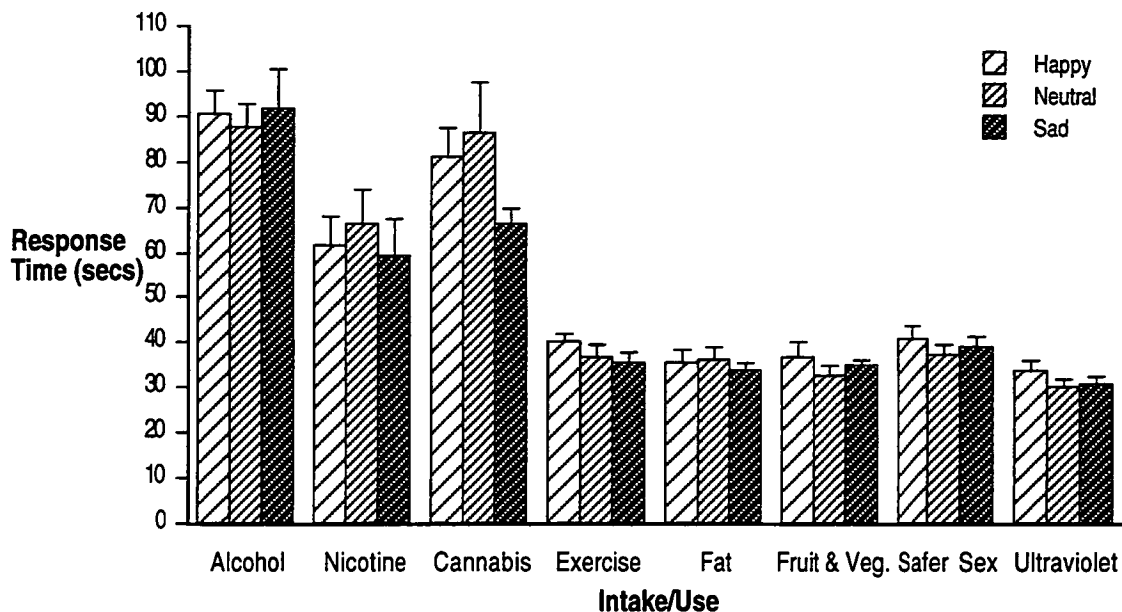


Figure 7.12 Response times with happy, neutral or sad mood, for Experiment 3. (Over 5 items relating to alcohol, 6 items to nicotine and 6 to cannabis; 3 items for each of the others. Alcohol, $N = 49$; nicotine, $N = 22$; cannabis, $N = 23$; others, $N = 60$.) Vertical lines depict standard errors of the means.

A 3 (Mood induction) \times 2 (Sex) ANOVA for users only of alcohol, nicotine and for all participants in the areas of exercise, fat consumption, fruit and vegetable consumption, safer sexual behaviour or protection against ultraviolet radiation, showed no significant main effects or interactions.

For cannabis, however, there was a significant difference in response time between males and females, $F(1,17) = 6.59$, $p = .020$, with females, $M = 85.64$ secs ($SD = 23.28$) taking longer than males, $M = 65.00$ secs ($SD = 8.73$). It can be seen that there was a much greater variability in response time for females than for males. There were no other significant effects.

The hypothesis that people in whom a sad mood had been induced would take longer to process information than those in whom a happy mood had been induced was not upheld.

A summary of findings related to mood in terms of number of participants, *N*, and *p*-values, is given in Table 7.3.

Table 7.3 Summary of Mood Main Effects in Experiment 3.

<i>Preliminary analyses</i>		<i>N</i>	<i>p</i>				
<i>Age</i>		60	.998				
<i>Mood before inductions</i>		60	.017 *				
<i>Mood after induction</i>		60	.001 *				
<i>Final mood (end of experiment)</i>		60	.158				
				<i>p-values</i>			
<i>Main analyses</i>				<i>RT</i>	<i>Opt 1</i>	<i>Opt 2</i>	<i>Opt 3</i>
<i>Sum of analyses with 60 participants</i>		60		.692	.696	.692	.712
<i>Alcohol</i>		60		n/a	.402	n/a	n/a
<i>Alcohol</i>		49 drinkers only		.927	n/a	.314	.382
<i>Nicotine</i>		60		n/a	.616	n/a	n/a
<i>Nicotine</i>		22 smokers only		.685	n/a	.733	.660
<i>Cannabis</i>		60		n/a	.422	n/a	n/a
<i>Cannabis</i>		23 cannabis users only		.173	n/a	.935	.751
<i>Exercise</i>		60		.911	.223	.522	.240
<i>Fat items</i>		60		.847	.325	.098	.510
<i>Fruit & veg. intake</i>		60		.487	.537	.179	.592
<i>Safer sex</i>		60		.639	.983	.929	.641
<i>UV</i>		60		.390	.183	.596	.146

Note. * significant at $p = .05$ (mood congruent)

Variables: Mood type (Happy, Neutral, Sad), Sex (Male, Female)

Key: RT: Response time
 Opt 1: Optimism score (first) i.e. Prediction, given current behaviour (negative optimism score)
 Opt 2: Optimism score (second) i.e. Chances of change
 Opt 3: Optimism score (third) i.e. Predicted change in health, given behavioural change
 n/a not available/applicable

Correlations

Because ambient mood might be more pervasive than induced mood, correlational analyses were run between final mood and optimism ratings (cf. Salovey & Birnbaum, 1989) and between final mood and processing time. The results are included in the summary Table 7.4. These analyses showed positive correlations between all of pre-induction, post-induction and final mood ratings and prediction of problems given current behaviour across the summed ratings, thus supporting mood congruence. There

was a positive correlation between initial mood and chances of change ratings across relevant behaviours, also supporting mood congruence. As in Experiment 2, self-esteem correlated significantly with pre-induction and with post-experimental mood, but not with post-induction mood.

Table 7.4 Correlations for Experiment 3

	1.	2.	3.	4.	5.	6.	7.	8.
1. Initial Mood	1							
2. Mood check	.39*	1						
3. Final Mood	.69*	.74*	1					
4. Self Esteem	.33*	.19	.36*	1				
5. Problems (Alc to UV)	.36*	.24*	.41*	.18	1			
6. Chances (Ex to UV)	.27*	.07	.19	.21*	.48*	1		
7. Pred. Change (Ex to UV)	.07	.18	.006	-.01	-.43*	-.13	1	
8. RT (Ex to UV)	-.07	-.10	-.013	.16	.01	-.28*	-.21	1

Note: $df = 58$; critical value of $r = .21$

* Significant at $p = .05$.

As for Experiment 2, post-experimental questionnaires yielded no significant information.

Summary

First hypothesis

Across all three optimism ratings, ANOVAs showed no effects for mood, even for earlier items. That is there was no evidence in support of the first hypothesis – that people in whom a sad mood had been induced would make more pessimistic judgments than people in a happy mood.

Second hypothesis

Nor was there support for the second hypothesis that people in a sad mood would have a longer processing time than those in a happy mood (with neutral mood between).

Correlations

Correlational analyses showed some evidence of mood congruence consistent with the predictions of the AIM for substantive processing.

Experiment 4: Audiovisual Mood Induction and Pencil-and-paper-presented Items.

This experiment was run to ascertain whether computer administration diminished the effects of the mood inductions, for example because of the concentration required for its use, thus possibly accounting for lack of mood effects in Experiments 2 and 3. Other differences were that participants were all females and only two mood groups – happy and sad – were used. Mood was induced using the audiovisual technique employed in Experiment 2.

Method

Participants

Forty-four female first year Psychology students of mean age, $M = 22.18$ years ($SD = 8.37$) were recruited to participate in an experiment described as a social judgment study.

Design

A 2 x 2 between subjects factorial design was used, with mood (happy, sad) and response mode (pencil-and-paper, computer) as factors. As for Experiments 2 and 3, the dependent variables were ratings of perceived risk, perceived chance of modifying behaviour and estimated outcome of modification, and processing time.

Mood induction and manipulation checks

These were as for the Experiment 2.

Apparatus and materials

These were as for Experiment 2, except that items were presented in booklet form rather than on screen. A digital wrist watch was used by the experimenter to time responses.

Procedure

The procedure was as for Experiment 2 except that practice items and questionnaires were presented and responded to on paper and the experimenter noted times taken with a watch. The control group, however, used the computer as in Experiment 2 and 3. Results of ANOVAs are reported across both pencil-and-paper and computer groups combined. Figures show findings for both groups separately as well as combined.

Results and Discussion

Preliminary analyses

Baseline data

Analyses of variance, all of the form, 2 (Mood induction) x 2 (Response Mode), confirmed that there were no significant differences across groups induced with happy or sad moods for age, self-esteem or need for cognition.

Mood checks

Figure 7.13 shows mean mood ratings, on the sad - happy scale, for mood induction groups at *pre*-induction, *post*-induction and *end* of Experiment 4. Analysis of variance on the basis of a 3 (Occasion) x 2 (Mood induction) x 2 (Response Mode) design showed a significant Occasion x Mood induction interaction, $F(2,80) = 19.44$, $p = .001$ (with Geisser-Greenhouse correction). As can be clearly seen, across the methods analysed together, moods were manipulated in the intended direction, but were not maintained until the end of the experiment. Inspection of the graphs shows better mood maintenance for the pencil-and-paper group than for the computer-administered group although the improvement did not reach statistical significance.

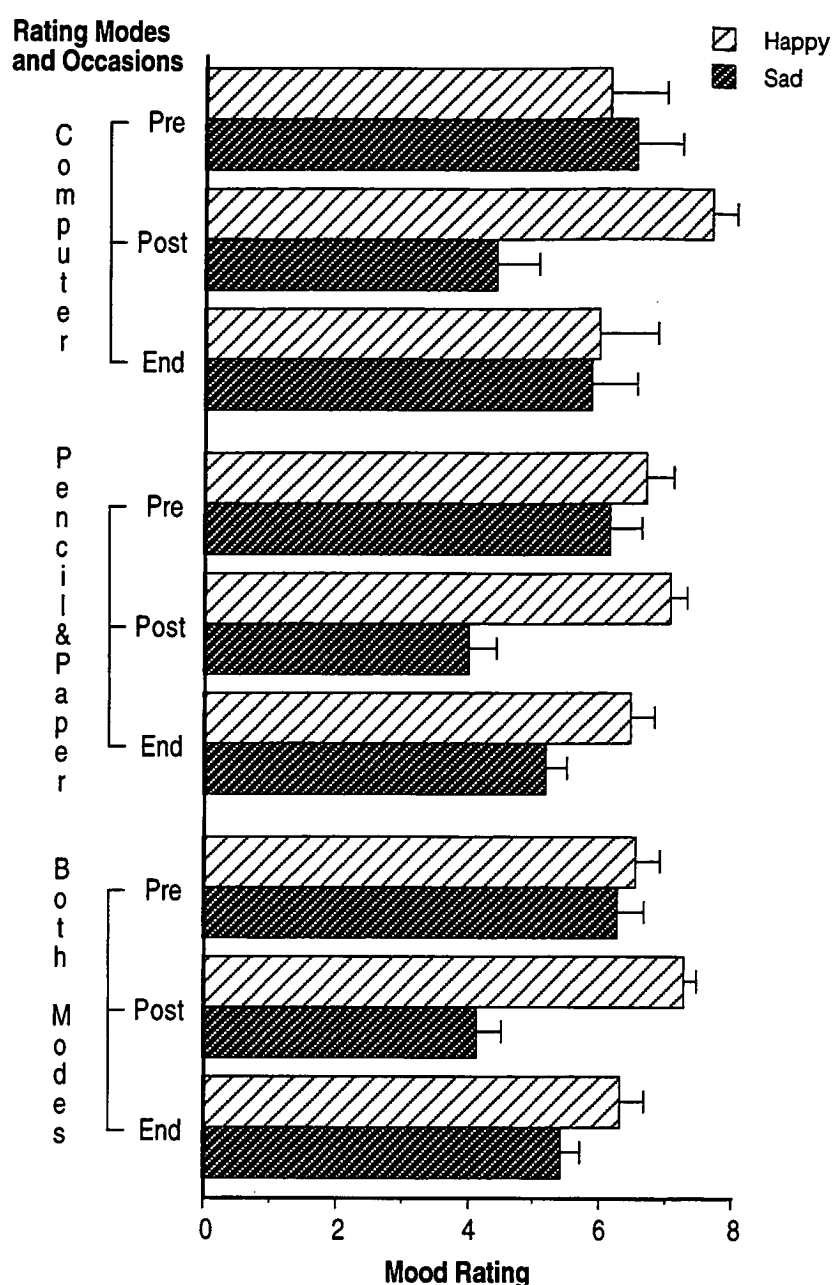


Figure 7.13 Mean mood ratings for mood induction groups, happy and sad, at pre-induction, post-induction and end of Experiment 4, for computer administered tests, pencil & paper tests and both. Vertical lines depict standard errors of the means.

Analysis of variance of the form 2 (Mood induction) x 2 (Response mode) on mood ratings on the sad - happy scale made at the following points during the experiment showed the following effects.

- (i) A pre-induction (*pre*) ANOVA showed no significant effects, and in particular that there was no significant difference between the two mood groups prior to the mood induction procedures.
- (ii) Immediately post-induction (*post*) ANOVA showed a significant main effect for mood, $F(1,40) = 52.00, p < .001$. There were no other significant effects.
- (iii) At the end of the experiment (*end*) ANOVA showed that the difference in mood ratings due to the sad and happy mood inductions was no longer significant.

Again it would seem that any mood effects would be more likely to be found in responses to earlier rather than to later items.

Testing the major hypotheses: impact of mood on health judgments

Impact of mood on health ratings

As in Experiments 2 and 3 participants rated

- 1. The likelihood of specific problems given their current behaviour.
- 2. Perceived chances of modifying their current behaviour in a healthy direction.
- 3. The improvement they expected might result from such a change.

This yielded 3 optimism scores as dependent variables. Where necessary raw scores were reversed so that more optimistic scores would be expressed as higher ratings.

Scores were:

- (i) Current prediction
- (ii) Chances of change
- (iii) Predicted change in health (expected improvement rating minus likelihood rating given current behaviour, i.e. *score on 3 - score on 1*).

Current predictions

Current prediction across all behaviours

Mean ratings, summed across all behaviours, for perceived likelihood of encountering problems in the given area of behaviour given current practice for the two mood induction methods were:

Happy $M = 54.64$ ($SD = 8.31$)

Sad $M = 51.68$ ($SD = 11.73$)

The means were in the order predicted by the AIM but a 2 (Mood induction) x 2 (Response mode) analysis of variance indicated no significant differences between them, $F(1,40) = 0.98$, $p = .329$. Nor were there any other significant effects.

Current prediction for specific behaviours

Figure 7.14 shows mean perceived likelihood of encountering problems in the given area of behaviour, given current practice for pencil-and-paper respondents and computer respondents both separately and combined.

Analysis of variance over all participants showed that there were no significant effects on ratings for any of the eight health behaviours investigated.

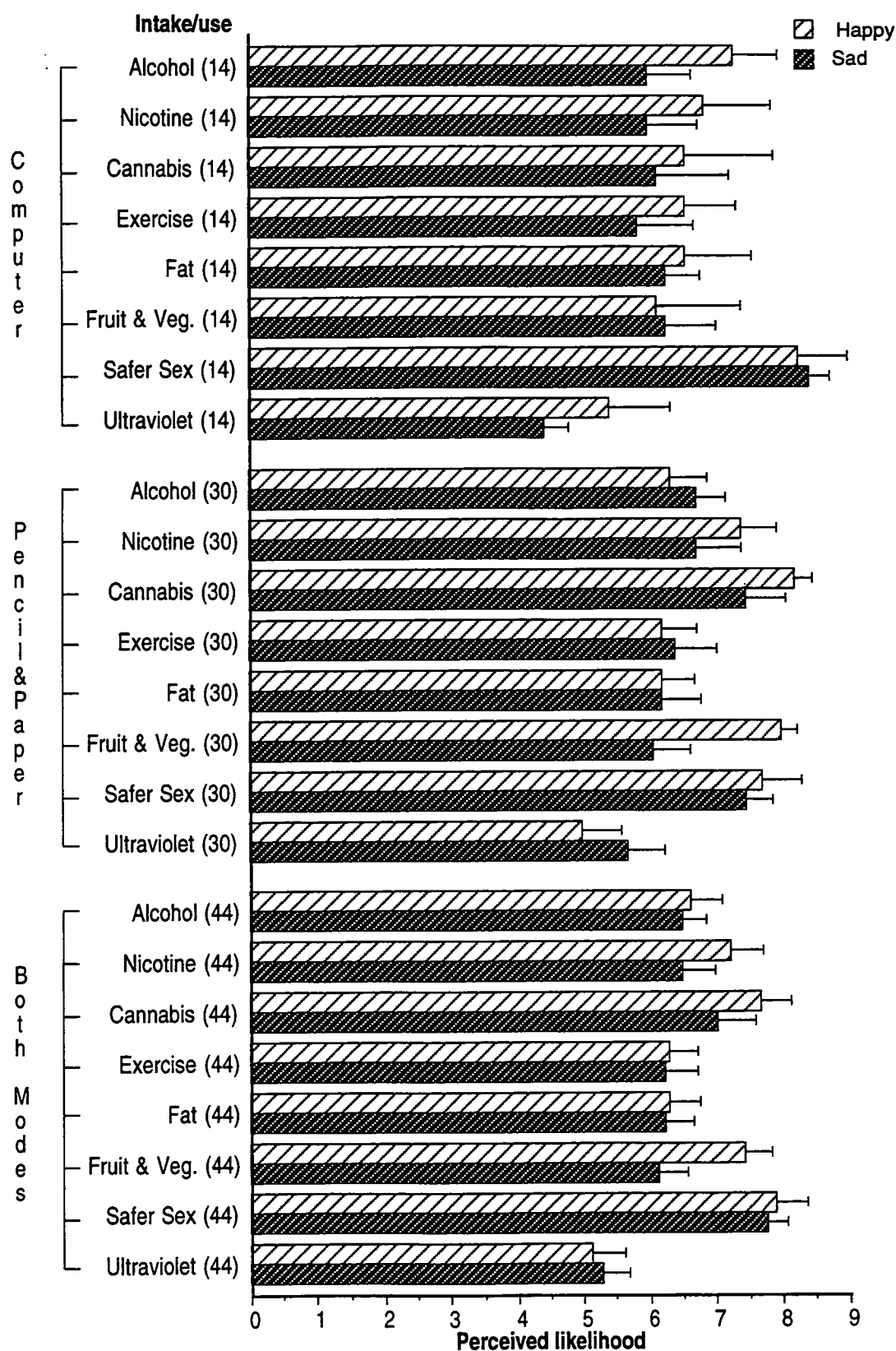


Figure 7.14 Perceived likelihood of encountering problems in the given area of behaviour, given current practice, with happy or sad mood for Experiment 4. Numbers in parentheses signify *N*. Vertical lines depict standard errors of the means.

Chances of change

Chances of change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for chances of change in behaviour given current practice for the two mood induction methods were:

Happy $M = 35.91$ ($SD = 6.96$)

Sad $M = 36.05$ ($SD = 6.41$)

The means were not in the order predicted by the AIM and analysis of variance indicated no significant differences between them, $F(1,40) = 0.02$, $p = .883$. Nor were there any other significant effects.

Chances of change for specific behaviours

Figure 7.15 shows mean perceived chance of successfully modifying behaviour in the given area given a decision to do so.

Analysis of variance showed that there were no significant effects involving mood or response mode for alcohol (for users), exercise, fat consumption, fruit and vegetable consumption, safer sex or exposure to ultraviolet radiation.

For nicotine users, there were no significant effects involving mood. There was a main effect for response mode, $F(1,10) = 6.56$, $p = .028$, with the pencil-and-paper group predicting a greater likelihood of change, $M = 7.78$ ($SD = 1.79$), than the computer group, $M = 5.20$ ($SD = 2.49$). This effect seems more likely to be due to the operation of random factors than to demonstrate an effect of response mode.

For cannabis users, there was a main effect for mood, $F(1,7) = 9.28$, $p = .019$, with mean scores: Happy, $M = 8.83$ ($SD = 0.41$), Sad, $M = 6.40$ ($SD = 1.67$), in the order predicted by the AIM.

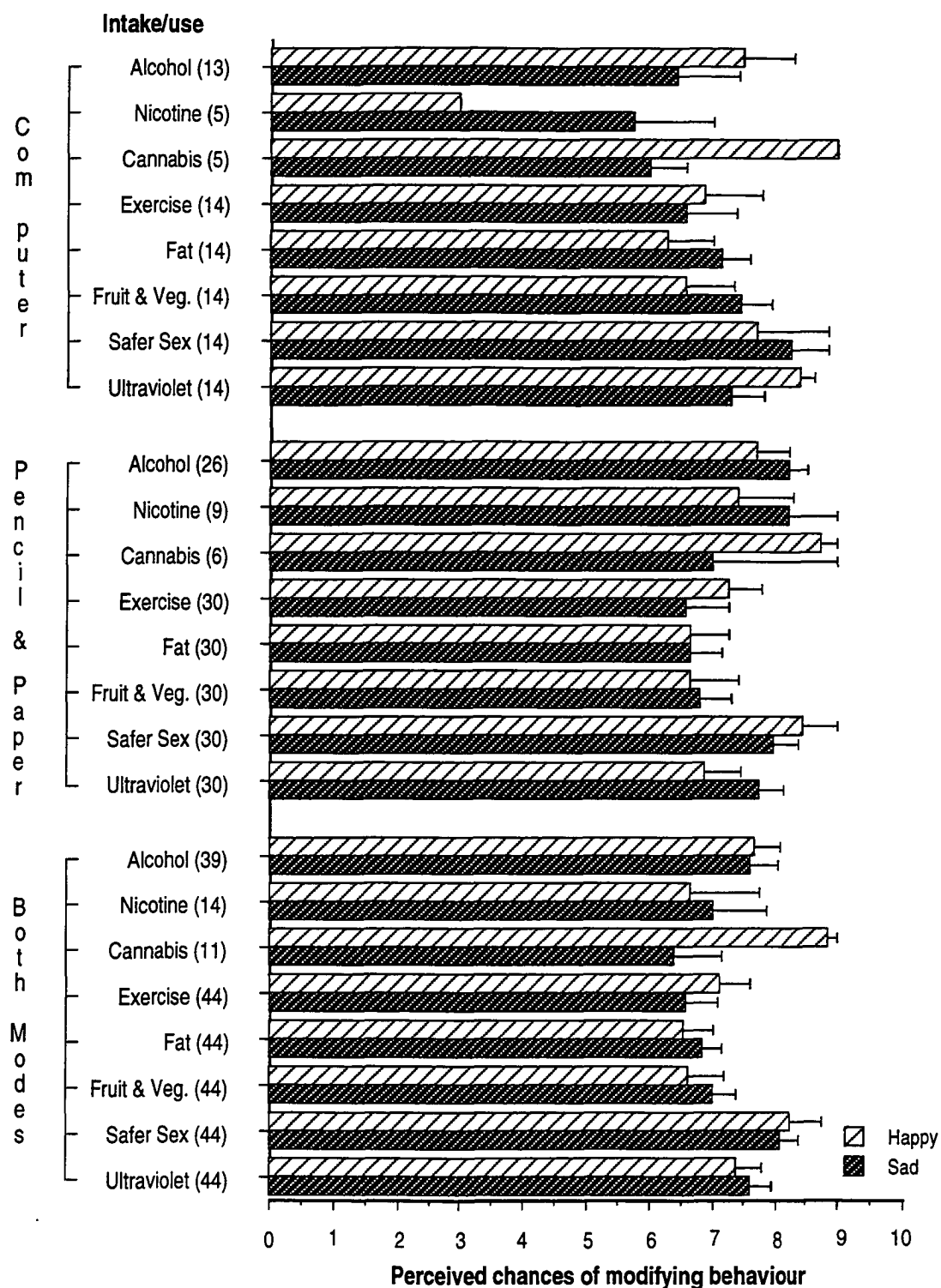


Figure 7.15 Perceived chance of successfully modifying behaviour in the given area, given a decision to do so, with happy or sad mood for Experiment 4. Numbers in parentheses signify *N*. Vertical lines depict standard errors of the means.

Predicted change

Predicted change across all behaviours

Mean ratings, summed across all behaviours (other than alcohol, nicotine and cannabis use) for predicted change in behaviour given current practice for the two mood induction methods were:

Happy $M = 2.23$ ($SD = 5.49$)

Sad $M = 4.73$ ($SD = 4.30$)

The means were not in the predicted order and analysis of variance indicated no significant differences between these ratings, $F(1,40) = 1.61$, $p = .212$. Nor were there any other significant effects.

Predicted change for specific behaviours

Figure 7.16 shows means for predicted change in health resulting from a behaviour change in the given area.

There were no significant effects involving mood or response mode, for alcohol (for drinkers), nicotine (for smokers), exercise, fat consumption, fruit and vegetable consumption, or exposure to ultraviolet radiation.

For cannabis, there was a significant effect for mood, $F(1,7) = 6.45$, $p = .039$, with the happy group, $M = 1.83$ ($SD = 2.93$) being more optimistic than the sad, $M = -0.80$, ($SD = 2.17$) in accordance with the AIM.

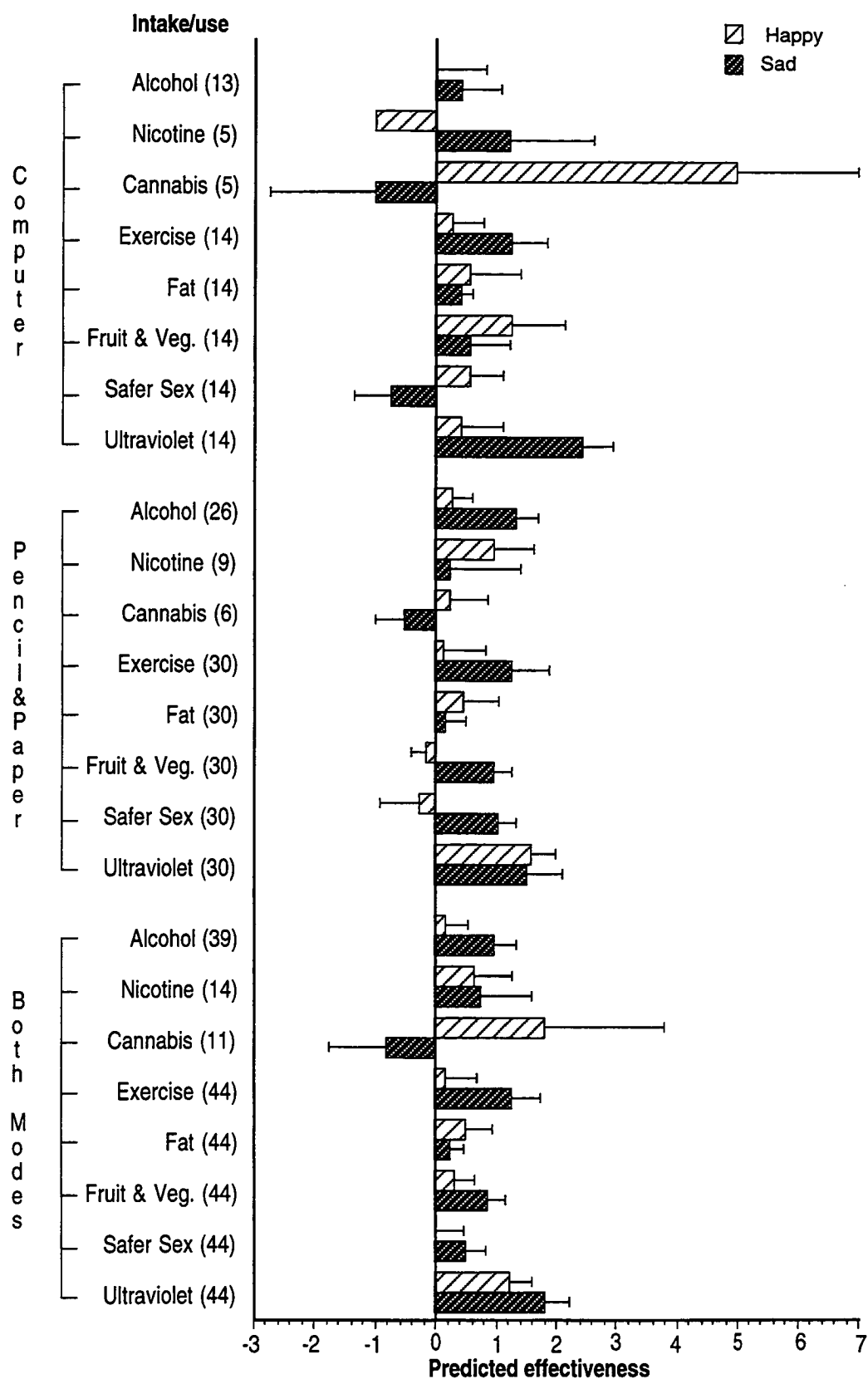


Figure 7.16 Predicted change in health resulting from a behaviour change in the given area with happy or sad mood for Experiment 4. Numbers in parentheses signify *N*. Vertical lines depict standard errors of the means.

For safer sex there was a significant interaction between mood and response mode (shown in Figure 7.17), with means comparisons indicating the difference between pencil-and-paper and computer modes to be significant for sad mood participants. The reason for this is not obvious.

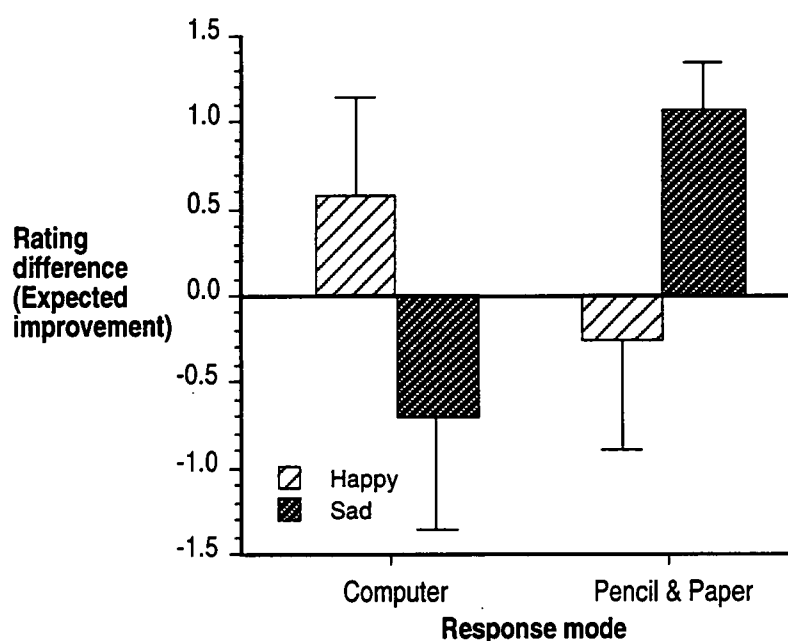


Figure 7.17 Expected improvement due to behaviour change - safer sex. Vertical lines depict standard errors of the means.

Impact of mood on processing time

Impact of mood on processing time across all behaviours

When response time was summed across all ratings (other than for alcohol, nicotine and cannabis use), mean response times (in seconds) for each induction method were:

Happy $M = 173.59$ ($SD = 46.98$)

Sad $M = 165.05$ ($SD = 36.31$)

These response times were not in the predicted order and there were no significant effects.

Impact of mood on processing time for specific behaviours

Figure 7.18 shows the mean response times for the individual behaviours with the two moods for pencil-and-paper respondents, computer respondents, and for both response modes.

Analyses of variance, for users of nicotine or cannabis, and for all participants in the areas of exercise, fat consumption, safer sexual behaviour or protection against ultraviolet radiation, showed no significant effects involving mood.

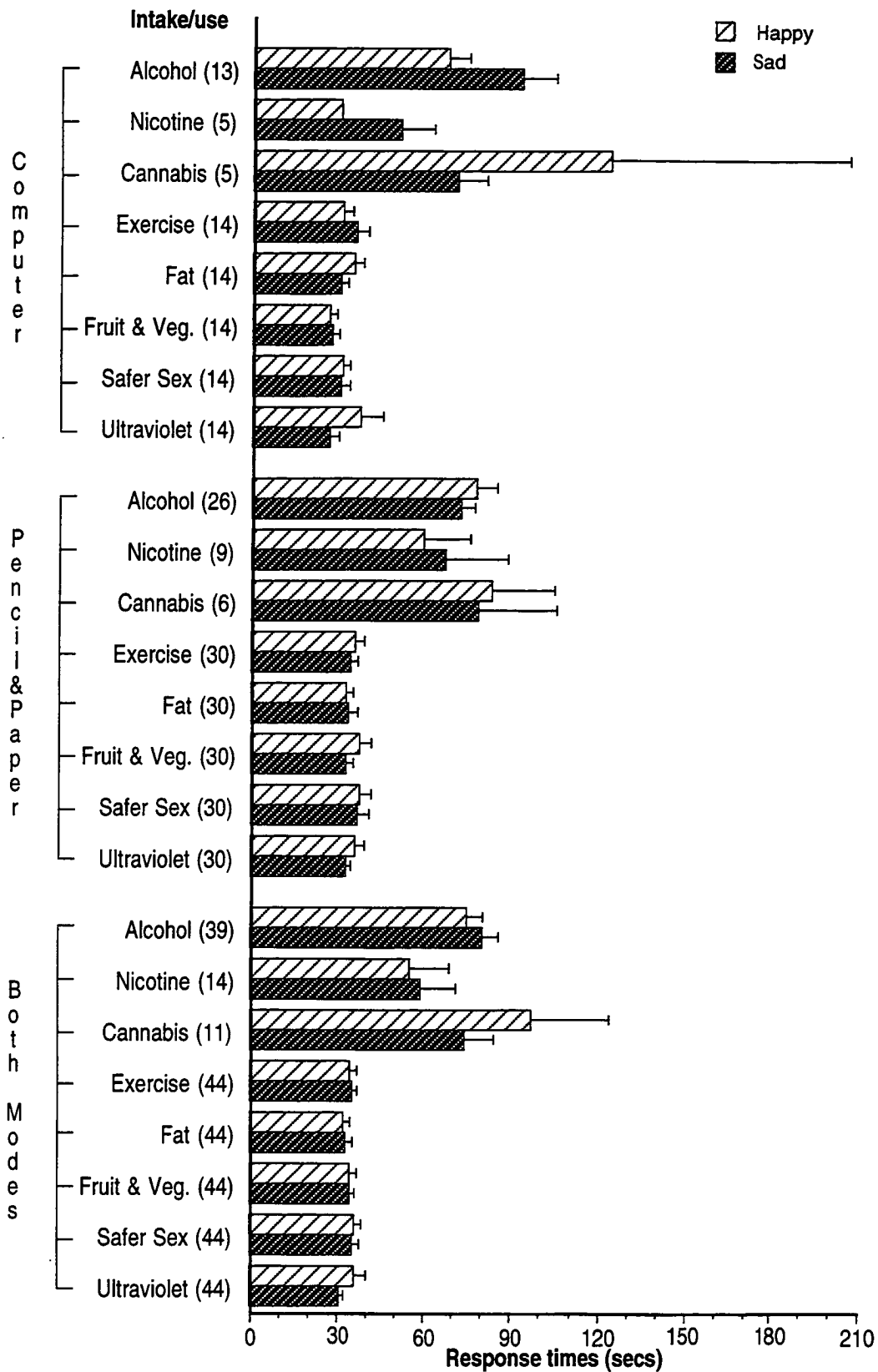


Figure 7.18 Response times for happy and sad mood, for Experiment 4. Numbers in parentheses signify *N*. Vertical lines depict standard errors of the means.

For alcohol, however, there was a significant interaction between mood and response mode, $F(1,35) = 4.28, p = .046$, with the computer group taking much longer if sad than if happy as shown in Figure 7.19.

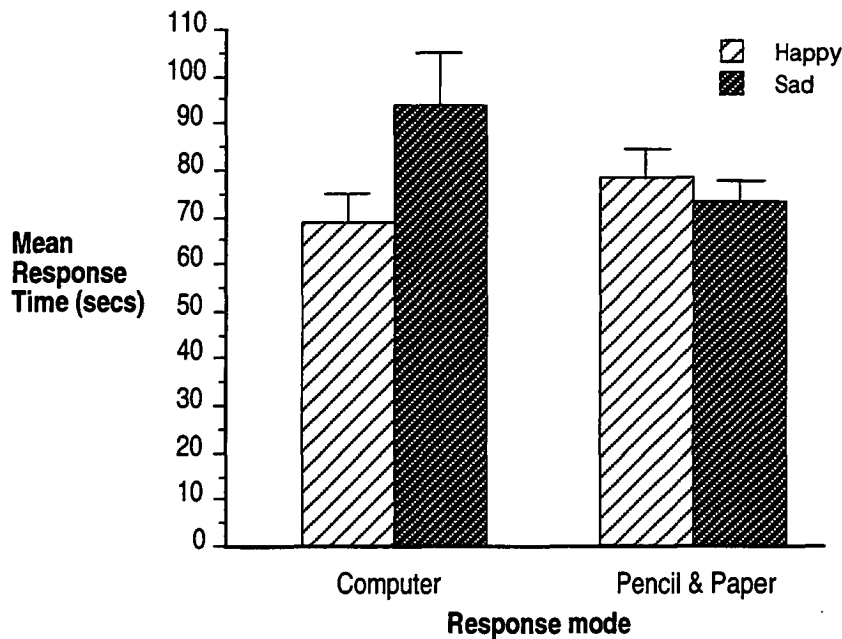


Figure 7.19 Response time for alcohol drinkers only. Vertical lines depict standard errors of the means.

For fruit and vegetable consumption there was a significant main effect for response mode, $F(1,40) = 6.97, p = .012$, with the pencil-and-paper participants taking $M = 35.53$ secs ($SD = 10.95$), which was longer than the computer group, $M = 27.29$ secs ($SD = 5.70$).

Overall, there was little support for the hypothesis that people in whom a sad mood had been induced would take longer to process information than those in whom a happy mood had been induced.

A summary of findings related to mood in terms of number of participants, N , and p -values, is given in Table 7.5.

Table 7.5 Summary of Mood Main Effects in Experiment 4.

<i>Preliminary analyses</i>		<i>N</i>	<i>p</i>				
<i>Age</i>		44	.071				
<i>Mood before inductions</i>		44	.886				
<i>Mood after induction</i>		44	.001 *				
<i>Final mood (end of experiment)</i>		44	.204				
<i>Main analyses</i>				<i>p-values</i>			
				<i>RT</i>	<i>Opt 1</i>	<i>Opt 2</i>	<i>Opt 3</i>
<i>Sum of analyses with 60 participants</i>		44		.537	.329	.883	.212
<i>Alcohol</i>		44		n/a	.481	n/a	n/a
<i>Alcohol</i>		39 drinkers only		.190	n/a	.669	.159
<i>Nicotine</i>		44		n/a	.327	n/a	n/a
<i>Nicotine</i>		14 smokers only		.559	n/a	.211	.609
<i>Cannabis</i>		44		n/a	.447	n/a	n/a
<i>Cannabis</i>		11 cannabis users only		.440	n/a	.019 *	.039 *
<i>Exercise</i>		44		.629	.721	.524	.162
<i>Fat items</i>		44		.884	.838	.508	.716
<i>Fruit & veg. intake</i>		44		.503	.184	.501	.655
<i>Safer sex</i>		44		.869	.916	.977	.968
<i>UV</i>		44		.091	.808	.802	.114

Note. * significant at $p = .05$ (mood congruent)

Variables: Mood type (Happy, Neutral, Sad)
Response mode (Computer, Pencil & Paper)

Key: RT: Response time
Opt 1: Optimism score (first) i.e. Prediction, given current behaviour (negative optimism score)
Opt 2: Optimism score (second) i.e. Chances of change
Opt 3: Optimism score (third) i.e. Predicted change in health, given behavioural change
n/a not available/applicable

Correlations

As for the previous experiment, because ambient mood might be more pervasive than induced mood, correlational analyses were run between final mood and optimism ratings (cf. Salovey & Birnbaum, 1989) and between final mood and processing time. The results are included in the summary Table 7.6. There was no evidence of mood congruence. As in Experiments 2 and 3, self-esteem correlated significantly with pre-induction and with post-experimental mood, but not with post-induction mood.

Table 7.6 Correlations for Experiment 4 (Pencil & Paper Respondents Only)

	1.	2.	3.	4.	5.	6.	7.	8.
1. <i>Initial Mood</i>	1							
2. <i>Mood check</i>	.24	1						
3. <i>Final Mood</i>	.65*	.65*	1					
4. <i>Self Esteem</i>	.38*	.26	.35*	1				
5. <i>Problems (Alc to UV)</i>	.05	.18	.13	.41*	1			
6. <i>Chances (Ex to UV)</i>	-.02	-.16	.05	.07	.03	1		
7. <i>Pred. Change (Ex to UV)</i>	.00	-.19	-.01	-.55*	-.59*	-.15	1	
8. <i>RT (Ex to UV)</i>	.05	-.04	.05	.01	-.32*	-.21	-.09	1

Note: $df = 28$; critical value of $r = .31$

* Significant at $p = .05$

As for Experiment 2 and 3, post-experimental questionnaires yielded no significant information.

Summary

First hypothesis

Across all three optimism ratings investigated, ANOVAs showed little indication of mood congruence. Therefore the first hypothesis – that participants in whom a sad mood had been induced would make more pessimistic judgments about both the possibility, and the outcome, of modifying their behaviour, and those with a happy mood would make more optimistic judgments – was not well supported.

Second hypothesis

Nor was there support for the second hypothesis that participants in whom a sad mood was induced would have a longer processing time than those in a happy mood.

Correlations

Correlational analyses showed no evidence of mood congruence.

General Discussion of Findings of Experiments 2, 3 and 4

The hypotheses that if Forgas's model applies to health judgments then:

1. participants in whom a sad mood is induced would make more pessimistic judgments about both the possibility and the outcome of modifying their behaviour; and those in whom a happy mood is induced will more make more optimistic judgments (with neutral mood in between) *and*
 2. participants in whom a sad mood is induced would have a longer processing time; and those in whom a happy mood is induced will have a shorter processing time (with neutral mood in between),
- received little support from Experiments 2, 3 and 4.

Furthermore, although there was some correlational evidence of mood congruence, in that health ratings sometimes correlated with measures of mood at *pre*-induction, *post*-induction or *end*-of-experimental stages, such findings were inconsistent across the three experiments reported in this chapter.

This group of experiments had the following strengths:

1. Happy and sad moods were effectively induced.
2. Mood was thoroughly monitored.
3. Two mood induction methods: audiovisual and autobiographical, and two response modes: computer and pencil-and-paper, were used.

It was therefore appropriate to give detailed consideration to the lack of mood effects.

Procedural issues

Some possible procedural factors (and possible remedies) for lack of mood effects were seen to be as follows.

Although mood ratings were included with distractor scales to de-emphasise them it was considered possible that mood awareness and/or compliance effects might still have occurred. To remedy this the number of mood checks could be reduced.

Ambient mood might have over-ridden effects of induced mood. Allocation to mood groups could be planned so that the happiest people would be assigned to the happy group and the saddest to the sad group. An argument against this would be that a hybrid experiment would result: a mixture of a true experiment (with actual manipulation) and a quasi-experiment (based on groups which differed at the beginning).

A shorter health-judgment questionnaire could be used, however in the present experiments mood effects could have been expected in response to earlier items, and in any case, in the experiments reported in this chapter, mood was better maintained with the pencil-and-paper response mode (as illustrated in Figure 7.13) and mood effects were still not observed.

The issue of personal relevance of health issues could be considered. A restricted age range with only older participants might yield a group more susceptible to mood effects on health. Alternatively, a group whose health was in some way threatened could be used. However, Salovey and Birnbaum (1989) found no mood effects for ill people, so this suggestion was considered to be of doubtful value. A third possibility considered was that a group experiencing a more serious and immediate health threat might show affect infusion.

Theoretical issues

Issues of a theoretical nature are discussed under three headings, relating to the adequacy of the AIM, health issues and the AIM, and substantive processing and health judgments.

The adequacy of the AIM

Substantive processing is expected when an issue has high personal relevance (Petty & Cacioppo, 1981, 1986) and is the type of processing in which mood influence is most likely (Forgas, 1994a). Curren and Harich (1994) however, found with product advertising, that mood biased judgments only when an evaluation *lacked* personal relevance – opposite to what the AIM would predict. Also, Storchheim (1995), found no evidence of mood-congruent bias in judgments of job applications.

Another consideration is the effect of mood regulation. A movement from substantive or heuristic to motivational processing might be inferred from findings of Sedikides (1994) who found that, although sad mood at first influenced self-descriptions in a mood congruent way, self-descriptions became more positive as mood regulation strategies apparently came into effect. Also, Smith and Petty (1995) found that with negative induced mood, participants with low (but not high) self-esteem showed mood congruent recall, which again points to possible mood regulation by people high in self-esteem.

Processing for a given task might well include more than a single one of the four types of processing of the AIM. Instances where empirical findings are not consistent with the model could be accounted for by movement between processing types. Further, if it were not possible to predict that substantive processing would occur, but that it could only be inferred after the data had been collected, there would be a problem with circularity.

A more general issue concerns the limits of the AIM and the range of phenomena to which it extends. A possible extension would be to postulate dynamic shifting between processing modes with search extent and search process depicted explicitly as continuous variables. Arrows included in the model might be required to indicate movement between processing types. Bearing in mind that the underlying processes

occur at neural level (Barnard & Teasdale, 1991; Izard, 1993) the reality is likely to be even more complex with several types of processing occurring concurrently.

Health issues and the AIM

An issue to be considered is whether the items presented in Experiments 2, 3 and 4, somehow rendered the AIM inapplicable. Given that Salovey and Birnbaum's (1989) results were consistent with the AIM, at least for negative health events, this was thought unlikely.

Perhaps the lack of affect infusion relates to issues concerning the self-concept in the matter of health judgments. Rhodewalt and Agustsdottir (1986) dealt with the effects of self-presentation on the phenomenal self. They saw people's awareness as arising out of (i) their interactions with the external environment, of (ii) their beliefs, values, attitudes and the implications of these for their behaviour. Such self-knowledge varies according to the social context. It might be that in younger people social influences might result in a view of self which negates mood effects.

It is possible that health judgments inevitably lead to motivated processing and an optimistic bias. This notion would be supported by Croyle and Uretsky (1987) who found that an ill-health scenario, which could be assumed to increase the accessibility of illness-related memories, reduced the effects of negative mood on health judgments. As self-relevance increased, affective influence decreased (cf. Curren & Harich, 1994, who found self-relevance to be associated with lack of mood effects). Adler, Kegeles and Genevro (1992) integrated models for predicting health behaviours, recognising that such behaviours are not only influenced by emotional and cognitive factors, but also by optimistic bias, which they defined in terms of people underestimating their own susceptibility to health problems, causing systematic bias in the appraisal of threat. The implication of this bias for mood and health judgments needs further consideration.

An optimistic bias might interfere with affect infusion but the data reported in this chapter gives no evidence of an optimism ceiling effect.

Substantive processing and health judgments

Substantive processing involves the 'active generation of new information' (Fiedler, 1991) and because of the reconstruction involved in such information processing it was predicted by the AIM to be likely to show affect infusion (Forgas, 1994a). The mood effects resulting from substantive processing were considered likely during observation and interpretation of social behaviours, as demonstrated by Forgas, Bower and Krantz (1984) and possibly to be even greater with more complex stimuli (Forgas, 1994a). The findings of Salovey and Birnbaum (1989) of affective influence on judgments about symptoms, health efficacy and future ill-health, made by healthy participants about negative health events, indicated that such health judgments were subject to affect infusion (Forgas, 1994a). However the mood-congruence findings of Salovey and Birnbaum (1989) applied neither to judgments made by sick participants, nor to judgments made about positive health events. In terms of the AIM this could be due to more direct processing occurring in such instances.

In summary, an issue to be addressed is that of reconciling the results reported in this chapter with those of Salovey and Birnbaum (1989). A detailed examination of Salovey and Birnbaum's materials was undertaken to ascertain possible reasons for the difference in findings, and a replication of their third experiment was planned as part of this series of experiments.

Chapter 8

Experiments 5 and 6: Two Procedural Issues

Chapter 8

Experiments 5 and 6: Two Procedural Issues

This chapter reports on two experiments undertaken to consider methodological issues to do with the experiments reported in Chapter 7. Experiment 5 dealt with the direction of the scales and Experiment 6 compared the depth of processing of the two item types.

Experiment 5: The Direction of the Scales

This experiment was undertaken to determine whether the direction of likelihood scales influenced the sort of ratings participants made. This was done to rule out the possibility that direction of the scales had somehow prevented findings in accordance with the AIM in Experiments 2, 3 and 4. Specifically, scales labelled *very likely* - *very unlikely* were compared with scales labelled *very unlikely* - *very likely*.

Method

Participants

Thirty-three second and third year university students (11 males and 22 females) of mean age 23.58 years ($SD = 7.48$) participated in this study as part of a Psychology practical class exercise.

Design

Direction of scale (*very likely* first or *very unlikely* first) and sex were between subjects factors.

Apparatus and materials

In this experiment there was no mood induction. Questionnaires for all participants were similar in that each contained ten items structured as in Experiments 2, 3 and 4, followed by ten items structured as in the experiments of Salovey and Birnbaum (1989). Copies of protocols for this experiment form Appendix C. A set of appropriate instructions preceded each set of items. Instructions and an example of items of the structure used in the experiments of this thesis follow.

Instructions:

On the following pages are some questions about how likely you are to suffer from the effects of various practices which could be hazardous to health and about how confident you are that you could make various health-related changes.

Whether or not you are actually trying to change your habits at present, please rate how confident you are that you would be able to make yourself do regularly the things suggested, if you wanted to.

(On next page:)

Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.

Example of a group of three items:

Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?

What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?

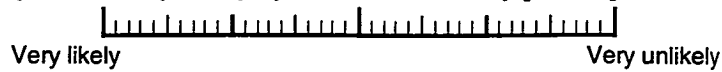
How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?

Example of three Salovey & Birnbaum items, with stem:

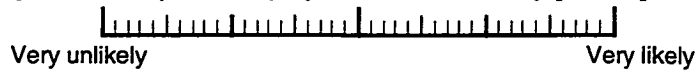
For each of the following items, please use the scale to indicate the likelihood that you will experience the situation at some stage in your life.

- Contracting some form of cancer.
- Achieving great cardiac fitness.
- Developing high blood pressure.

Example of the ““Very likely” first’ scale used by participants:



Example of the ““Very unlikely” first’ scale used by participants:



The visual analogue scales, as shown above, on which participants were asked to make ratings, were of the form used in the preceding experiments. That is they had nine major steps, with each step subdivided into five. The only difference between the materials administered to the two groups of participants was that one had all their likelihood rating scales starting with *very likely*, and the other with *very unlikely*. After the likelihood ratings was a page headed *Post-experimental questionnaire* with the following questions: “Did you find the scales confusing?” (*yes/no*), “Would you have found it easier if the scales had been reversed?” (*yes/no*) and “Please rate the scales you have completed for ease of use (1 = easiest, 9 = hardest)”. On the final page participants were asked to rate mood at that moment on a *sad - happy* scale embedded between an *alert - drowsy* scale and a *dreamy - attentive* scale.

Participants made their own recordings of time taken for their responses from a video-screened film of a digital clock a few metres in front of them.

Procedure

The experiment was run with participants in a group in a room from which daylight was excluded (Schwarz & Clore, 1983). They were told that they would be asked to answer some health related questions and were instructed to “put a line through the scale to indicate your rating”. The researcher demonstrated this on an exemplar scale. Participants were also told “if you wish to alter any rating you can go back and do it” and that there was no need to rush their answers. They were asked to write their age in years and their sex.

The time taken to make each style of rating (*very likely* - *very unlikely* or *very unlikely* - *very likely*) was measured by participants: an instruction at the beginning and end of items of the Dobber type and likewise of the Salovey and Birnbaum type (referred to, for convenience, here and subsequently, as being of the Salovey type) asked participants to “note down the time from the display clock” in a specially marked space. After completing likelihood ratings, participants answered questions about ease of use of the scales. Finally, participants made a mood rating. The number of corrections to ratings made by participants was counted by the experimenter for each type of item (Dobber items, Salovey items).

Results and Discussion

Direction of scale

Analysis of variance was performed on optimism score. This was derived for each participant by adding their ratings with score reversals as appropriate, so that the score was always an optimism, rather than a pessimism, score. The independent variables were direction of scale and sex. Mean scores were *very likely* first, optimism score $M = 118.63$ ($SD = 17.32$), *very unlikely* first, optimism score $M = 120.07$ ($SD = 14.21$), which were not significantly different, $F(1,29) = 0.10$, $p = .757$. Nor was the Direction of scale x Sex interaction significant. Furthermore, ANCOVA with age as a covariate showed no significant difference for age. Likewise with response time as the dependent variable there was no significant difference for direction of scale. Additional analyses for total optimism score and total time for Dobber items and Salovey items separately showed no significant difference for direction of scale. No significant differences were found for negative or positive items of either the Dobber or the Salovey type.

Responses to: Did you find the scales confusing? (yes/no)

One of the 18 participants with *very likely* first found the scale confusing, compared with 2 of the 15 with *very unlikely* first.

Responses to: Would you have found it easier if the scales had been reversed?

(yes/no)

One of the 18 participants with *very likely* first would have liked the scale reversed, compared none of the 15 with *very unlikely* first.

Responses to: Please rate the scales you have completed for ease of use.

(1 = easiest, 9 = hardest)

Mean ratings were *very likely* first $M = 3.63$ ($SD = 2.28$) and *very unlikely* first $M = 3.13$ ($SD = 1.77$). (where 1 = easiest, 9 = hardest) with ANOVA showing that scales were not rated as significantly different in ease of use.

Corrections made by participants

Very likely first resulted in mean number of corrections per person, $M = 0.17$ ($SD = 0.51$) and *very unlikely* first $M = 0.40$ ($SD = 0.63$), with ANOVA showing that scale direction did not result in a significantly different number of corrections by participants.

Summary

It was concluded therefore that the direction of scale made no significant difference to outcomes and therefore that the scale used in the experiments of this thesis was an appropriate one. Hence lack of mood effects was not in any way due to any confusion caused by the direction of the scale.

Correlations of mood with optimism score; of mood with response time

This experiment provided an opportunity to investigate correlations between scores and (ambient) mood ratings unconfounded by mood induction. As the hypotheses (that mood rating would correlate positively with health ratings and negatively with response time) were directional, the tests of significance were one-tailed. ($N = 33$, $df = 31$). As is evident from Table 8.1 showing correlations between mood and optimism scores and

response times and optimism scores, there were no significant correlations between mood and health ratings or between mood and response time.

Table 8.1 Correlations between Mood and Optimism Scores; Mood and Response Times.

<i>Mood with optimism scores</i>	<i>r</i>
total optimism score	.21
on Dobber items	.17
on Dobber negative items	.16
on Dobber positive items	.16
on Dobber neutral items	.08
on Salovey and Birnbaum items	.21
on Salovey and Birnbaum negative items	.08
on Salovey and Birnbaum positive items	.19
<i>Mood with response times</i>	<i>r</i>
total response time	.11
with response time for Dobber items	.15
with response time for Salovey and Birnbaum items	.01

Note: Critical value for $r = .30$. None of these correlations was significant at the .05 level.

Experiment 6: Comparing the Depth of Processing between the Two Item Types.

Depth of processing involves a hierarchy of processing levels so that processing happens at different 'depths', where 'depth' implies a greater degree of semantic analysis (Craik & Lockhart, 1972; Craik & Tulving, 1975). This experiment was designed to confirm that the depth of processing involved in making the judgments required by the items of the preceding studies (*Dobber*) was as least as great as that required by Salovey and Birnbaum's (1989) items (*Salovey*). Individuals from four participant groups made judgments of both the Dobber and the Salovey types, with order counterbalanced. Allowances were made for differences in item length, because the items used in the Dobber studies were longer than those used by Salovey and Birnbaum (1989). Because Salovey and Birnbaum asked for judgments for the average college student and then for the participant, a second, average university student judgment was incorporated for half of the participants responding to Dobber items and for half the participants responding to Salovey items.

The hypothesis was that participants would, when item length was taken into account, take as long or longer to make judgments of the Dobber type than for those of the Salovey type. This hypothesis was tested for two situations: when participants were asked to make ratings only for themselves and when they were asked to make a rating for the average university student and for themselves. To avoid confusion, the term "average" in reference to students has been replaced by the term "typical" in reports of statistical analyses.

Method

Participants

Participants were 60 university students (16 males and 44 females) of mean age, $M = 21.68$ ($SD = 6.98$) recruited to participate in an experiment described as a social judgment study.

Design

Half of the participants were asked to make ratings only for themselves and the other half were asked to make a rating for the typical student and for themselves. Order of items (Dobber first or Salovey first) was counterbalanced. This resulted in four experimental groups. Analyses involved simple comparisons between times taken for processing of items of the Dobber, and of the Salovey type. This was done separately for those participants who answered only about themselves (*self only*) and those who also made a rating for the typical student (*typical&self*). To eliminate order effects analyses were run according to the principles of a mixed Latin Square design (Keppel, 1982).

Apparatus and materials

Participants were given a set of questionnaires, each set consisting of a numbered consent form followed by a general set of instructions for making likelihood ratings which were specific to the item type (Dobber, Salovey) and for item target (self only, typical&self). Then followed some pages of health statements, each statement having a rating scale next to it. After two sets of ratings (with order of item type counterbalanced) there were two sets of health statements (identical to the previous but without corresponding rating scales) which participants were asked simply to read through. Copies of protocols for this experiment form Appendix D.

The experimenter used a digital wrist-watch to measure the time taken for each part of the experiment.

Procedure

Each participant was run separately. The experiment was conducted in a room from which the daylight was excluded to prevent (or reduce) effects of weather on mood (Schwarz & Clore, 1983). Participants were told:

I would like you to answer some questionnaires. Put a line through the scale to indicate your rating as on the demonstration scale (for both sets of likelihood ratings).

They then made the ratings, while the experimenter noted times taken to complete Salovey and Dobber items separately. Participants were told:

I would like you to read through these items to get an idea of how long it took you to read them when you were making the likelihood ratings. Please read them at the same rate, but there is no need to think about the ratings this time. There is no need to read aloud, but moving your biro down the page might help you to concentrate.

At the end of the experiment participants were asked to make a mood rating on a *sad - happy* scale embedded between *alert - drowsy* and *dreamy - attentive* scales as in previous experiments. However, as in Experiment 5, there had been no mood induction. A post-experimental questionnaire was completed. Participants were informed of the purpose of experiment. They were also asked not to discuss the experiment with any one who might participate in the experiment later.

Results and Discussion

Two analyses of variance was performed, one for *self only* and one for *typical&self*. Processing time (that is response time minus reading time) was the dependent variable. Independent variables were sex (male, female) – a between subjects factor, item type (Dobber, Salovey) and item order (first, second) – both repeated measures factors.

For self, mean processing times were:

Dobber items, $M = 95.17$ secs ($SD = 33.72$)

Salovey items, $M = 61.17$ secs ($SD = 19.92$)

with a significant main effect for item type, $F(1,26) = 31.19$, $p < .001$, and no other significant effects.

For typical&self

Mean processing times by item type were:

Dobber items $M = 161.00$ secs ($SD = 56.10$)

Salovey items $M = 122.40$ secs ($SD = 34.62$)

which were significantly different, $F(1,26) = 14.67$, $p < .001$.

Mean processing times by order were:

Item presented first $M = 154.4$ secs ($SD = 54.3$)

Item presented second $M = 122.4$ secs ($SD = 42.8$)

which were significantly different, $F(1, 26) = 5.98$, $p = .022$.

On the basis of the significantly longer time taken for processing Dobber items it can therefore be concluded that the Dobber items involved processing which was at least as elaborative and therefore at least as likely to incur substantive processing (cf. Forgas, 1992a) as that required by the Salovey and Birnbaum (1989) items, and probably more so. It should be remembered that processing times are being compared – these were derived by subtracting reading times from response times, and hence allowed for the greater length of Dobber items. The significant main effect for item order for typical&self indicated that mean response time for items was influenced by the order of their presentation.

Correlations of mood with optimism score; of mood with response time

This experiment provided another opportunity to investigate correlations between scores and (ambient) mood ratings. As the hypotheses that mood rating would correlate

positively with health ratings and negatively with response time, were directional, the tests of significance were one-tailed. For scores of Dobber plus Salovey items, $N = 60$, $df = 58$. For scores of Dobber scores or Salovey scores separately, again, $N = 60$, $df = 58$, as each participant made ratings on both types of items. The results as shown in Tables 8.2 and 8.3 show significant correlations between mood and optimistic bias scores except for positive items, of either the Dobber or Salovey type, and also optimism scores for total Dobber items.

Table 8.2 Correlations of Mood with Optimistic Bias Scores (i.e. Self Score Minus Typical Score); Mood with Response Times. (Where Available.)

<i>Mood with</i>	<i>r</i>
total optimistic bias score (Dobber plus Salovey)	.27*
optimistic bias score, Dobber items	.24*
optimistic bias score, Dobber negative items	.23*
optimistic bias score, Dobber positive items	.15
optimistic bias score, Dobber neutral items	.23*
optimistic bias score, Salovey items	.37*
optimistic bias score, Salovey negative items	.26*
optimistic bias score, Salovey positive items	.08

<i>Mood with</i>	<i>r</i> (processing only)	<i>r</i> (processing and reading)
total time, (Dobber plus Salovey)	.153	.29*
time, Dobber items	.163	.29*
time, Salovey items	.108	.16

Note: Critical value for $r = .21$.

* Significant at the .05 level.

Table 8.3 Correlations of Mood with Optimism Scores for Self; Mood with Response Times. (Where Available.)

<i>Mood with</i>	<i>r</i>	<i>r</i> <i>(for mood with resp. time)</i>
total optimism score (Dobber plus Salovey)	.055	-.14
optimism score, Dobber items	.016	-.11
optimism score, Dobber negative items	.280*	
optimism score, Dobber positive items	-.252*	
optimism score, Dobber neutral items	.125	
optimism score, Salovey items	.088	-.16
optimism score, Salovey negative items	.111	
optimism score, Salovey positive items	-.004	

Note: Critical value for $r = .21$.
 * Significant at the .05 level.

Summary of Findings of Experiments 5 and 6.

Experiment 5 showed that the direction of the scale (*very likely* first or *very unlikely* first) made no significant difference to outcomes and therefore the lack of mood effects in Experiments 2, 3 and 4 was not in any way related to the direction of the scale.

Experiment 6 showed that the Dobber items took proportionately longer to process than did the Salovey items. This supports the view that the type of processing required for the items developed for use in the present research required at least as much semantic processing as that required by those used by Salovey and Birnbaum (1989). It can be concluded, therefore, that the items developed for these studies were at least as likely to incur substantive processing as those of Salovey and Birnbaum (1989) (cf. Forgas, 1992a).

The correlations evaluated for ambient mood and optimism/optimistic bias scores and with response time indicated no significant correlations in Experiment 5, but a number of significant correlations between mood and optimism/optimistic bias scores in Experiment 6, indicating some mood congruence.

Chapter 9

Experiment 7: Mood Influence on Judgments of the Salovey and Birnbaum Type and of the Type used in this Thesis

Chapter 9

Experiment 7: Mood Influence on Items of the Salovey and Birnbaum Type and of the Type used in this Thesis.

This experiment was designed to compare the effects of sad and happy induced mood on judgments used in the present series of experiments with those of the type used by Salovey and Birnbaum (1989). Because Salovey and Birnbaum asked for judgments to be made in relation to the average college student and then for the participant, this format was incorporated for half of the participants. The other half answered for self only. All participants, however, made judgments both of the *Dobber* and of the Salovey and Birnbaum (*Salovey*) types. Like those used by Salovey and Birnbaum (1989), health events were positive or negative. In the case of Dobber items, some were also neutral in valence.

Examples of health events and their valences used by Salovey and Birnbaum were:

“Contracting some form of cancer” – negative valence.

“Regularly maintaining a well-balanced diet” – positive valence.

Examples of items of the type and their valences used in the present experiments were:

“Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer by the age of 70” – negative valence.

“What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to” – positive valence.

“How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?” – neutral valence.

Hypotheses

Preliminary hypothesis

A preliminary hypothesis was based on Weinstein's (1980) work on 'optimistic bias'. This view would hypothesise that individuals consider themselves less vulnerable to illness than their peers and it was accordingly proposed that participants who made ratings for a typical student as well as themselves would make more optimistic health ratings for themselves than for a typical student.

Major hypotheses

The major hypotheses, based on Salovey and Birnbaum's (1989) Experiment 3 findings and Forgas's (1994a) Affect Infusion Model, were that participants in whom a sad mood was induced would

- (i) make more pessimistic judgments

and

- (ii) process information more slowly

than those in a whom a happy mood was induced.

Method

Participants

Participants were 70 second and third year Psychology students, 10 males and 60 females, who participated as part of their course of mean age 23.43 ($SD = 7.45$).

Design

A 2 x 2 design was used with factors: mood induction (sad, happy) and item type (Dobber, Salovey). Item type order (Dobber first or Salovey first) was counterbalanced. Item type was a within subjects factor and mood induction a between subjects factor. Half of the participants were asked to answer only about themselves (as in Experiments 2, 3 and 4) and half were asked, item by item, first about the average student and then

about themselves (cf. Salovey & Birnbaum, 1989). The rating given to the “average student” was subtracted from that given for “self” to obtain an optimistic bias rating (cf. Salovey & Birnbaum, 1989). As in Chapter 8, to avoid confusion, the term “average” in reference to students was replaced by the term “typical” in reports of statistical analyses.

Dependent variables

The dependent variables were

- (1) optimism scores on negative items
- (2) optimism scores on positive items
- (3) total optimism scores (negative, neutral and positive items)
- (4) corresponding response times (where appropriate).

Mood induction and mood manipulation checks

Mood was induced by the autobiographical method described in Chapter 6 and used in Experiment 3. In this experiment, to reduce further the possibility of mood awareness or compliance effects, participants’ mood ratings were requested only after the health judgments had been made. As in previous experiments, mood ratings were made on a sad - happy scale, again embedded among distractor scales.

Apparatus and materials

Participants were given their own set of questionnaires each consisting of

1. a numbered consent form
2. an instructions page indicating
 - (i) that the consent form was to be torn off after completion so that replies would be confidential, and,
 - (ii) that the set of questionnaires included
 - (a) Life event description
 - (b) Health inventory

(c) Likelihood ratings sheets

A request "Please follow all instructions" came next. This was followed by a 28 item 'Health Inventory' (Salovey & Birnbaum, 1989) to ensure that participants were uniformly healthy across the groups and an 'Autobiographical Memory Inventory' for happy or sad mood induction with one and a half pages of lined paper.

Then came an instruction page for 'A Health Ratings Experiment' explaining the use of the rating scale and asking for the participant's age and sex. Instructions for responding to likelihood ratings for Salovey items and for Dobber items followed. Specific instructions were given depending on two issues:

- (i) item type (Dobber or Salovey), *and*
- (ii) the number of items: whether participants were asked to make judgments for the average student as well as for themselves or just for themselves.

Health events with associated scales for ratings came next. An instruction at the beginning and end of the block of items of the Dobber type, and likewise of the Salovey type, asked participants to "note down the time from display clock" in a specially marked space.

On the penultimate page participants were asked "Please read the following word pairs and mark, with a line through the scale, the position on the scale that refers to you *at this moment*". The scales were alert - drowsy, sad - happy and dreamy - attentive, all with 9 major points. A post-experimental questionnaire followed. Copies of protocols for this experiment form Appendix E.

The experimenter used a stop-watch to measure the ten minute mood induction period (that is the time participants were allowed to complete the Autobiographical Memory Inventory). Participants made their own recording of time taken for their responses from a video-screened film of a digital clock a few metres in front of them.

Procedure

The experiment was conducted in a room from which daylight was excluded (Schwarz & Clore, 1983). Participants were told:

I have some questionnaires for males and some for females as I want an even spread. I would like you all to keep in step for the first part of today's work. Please read and complete the consent form. I will discuss fully with you the purpose of the experiment at the end of today's session. Meanwhile, if you have any questions now I will do my best to answer them.

Consent forms were then detached by participants and collected by the experimenter to ensure anonymity of responses. The video-clock was shown to participants and it was explained that they would later be asked to record time in minutes and seconds. Participants were asked to complete the health inventory. They were then asked to turn over the page and told:

On this page is an Autobiographical Memory Inventory. Please read the instructions and respond to the questions on the dotted lines. One and a half pages have been allocated for your response and this is always enough space. Take your time as you will have ten minutes to write your answers. I will tell you when ten minutes is up.

After ten minutes participants were told:

Please finish up now. Just finish writing your sentence or idea. Then turn over the page and we will read the instructions for the Health Ratings experiment. Do you understand how to use the scale? This is where you will be asked to note the time on this clock (just minutes and seconds). Please write in your age and circle male or female. Fairly soon now you can work right through to the end for yourself, following any instructions as you go. Some people will take more time to finish than others as some people have more questions to answer. When you have finished please sit quietly. Do not forget to write in the times as asked. Please turn over the page, read the instructions, begin and continue at your own pace.

Following these tasks a post-experimental questionnaire was completed. Participants were then debriefed on the use and purpose of the mood induction procedure and on the

purpose of the whole experimental program. Those who had been induced with a sad mood group were offered the opportunity of further debriefing.

Results and Discussion

Preliminary analyses

Age distribution across cells

Analysis of variance showed that mean ages of males, $M = 23.00$ ($SD = 7.86$) and females, $M = 23.50$ ($SD = 7.45$) were not significantly different from each other. However mean ages were significantly different for the mood groups, $F(1,68) = 5.63$, $p = .021$. For the group induced with a happy mood, $M = 21.32$ years, ($SD = 4.68$); for the group induced with a sad mood, $M = 25.42$, ($SD = 8.97$). A graph (Figure 9.1) was drawn to illustrate age spread. This clearly shows that the ages fell into two groups, 19 to 28 and 39 to 45, with a large proportion of sad mood participants in the older group.

The options were (i) to divide age into levels as another factor, (ii) to perform analyses of covariance with age as a covariate, or (iii) to find out what occurred when data from the older age group was omitted from analyses. The relatively low number of older

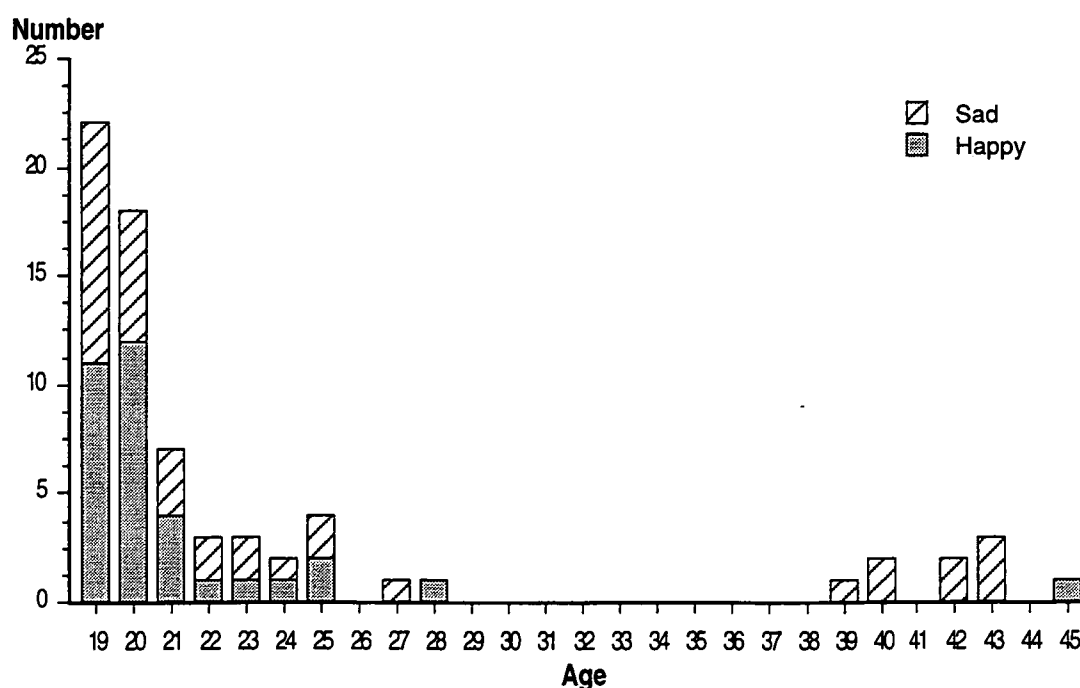


Figure 9.1 Ages and induced mood of participants in Experiment 7.

participants and its unbalanced distribution between the two mood groups made two age levels inappropriate. The irregular, extremely bimodal, age distribution made use of analysis of covariance inappropriate as it assumes a constant relationship between the covariate (age) and the independent variable. The large age gap in the bimodal distribution meant that the small number of mature age students with extreme scores could have a large effect on the ANCOVA. The option chosen therefore, was to analyse results with data from the whole group and to compare these results with those obtained when the data from the older participants was excluded. A younger subset, those aged under 25, was selected for the purpose. The terms *set* and *subset* here are applied as in mathematical set theory, to express clearly that the age inclusive group, the set, included the younger group, the subset. The issue of the cut off point for the younger aged subset was decided in the context of both this experiment and the next (Experiment 8) to eliminate age differences between the groups produced by random allocation. For both experiments there were no significant differences in age between the mood groups when 25 was chosen as the cut-off point.

All findings are reported, but in the interests of clarity, findings are given in detail only for the whole group, that is, the age inclusive set. Findings for the younger subset are given in detail only if they are dissimilar to those of the age inclusive set, or if they involve mood.

Health status of participants

Over all participants (the age inclusive set), ANOVA showed that the mean number of ill-health symptoms for the day of the experiment was not significantly different between sad and happy groups. For the group to be induced with a happy mood, mean number of symptoms was $M = 4.03$, ($SD = 4.71$), and for those to be induced with a sad mood rating, mean number of symptoms was $M = 3.72$, ($SD = 3.79$) (cf. Salovey and Birnbaum's ill participants who reported, on average, 8 or 9 symptoms in their Experiments 2 and 1 respectively, from the same checklist.) The health ratings for the

week prior to the experiment were not significantly different between the two groups. For the group induced with a happy mood, the mean number of symptoms was $M = 10.77$, ($SD = 5.63$) and for the group induced with a sad mood, $M = 8.97$, ($SD = 4.33$).

These results were mirrored by those for the younger subset, where the mean numbers of ill-health symptoms for the day of the experiment was not significantly different between the groups; for the group to be induced with a happy mood, the number of symptoms was $M = 4.00$, ($SD = 4.45$) and for the group to be induced with a sad mood number of symptoms, $M = 3.08$, ($SD = 3.70$). The health ratings for the week prior to the experiment were not significantly different between the mood groups. For the group induced with a happy mood, the number of symptoms was $M = 10.40$, ($SD = 5.53$); for the group induced with a sad mood, the number of symptoms was $M = 8.40$, ($SD = 4.43$).

Mood manipulation/retention check

Of the 70 participants (age inclusive set), there were 34 people in the happy mood group and 36 in the sad. Analysis of variance showed that mood was successfully manipulated and maintained until the end of the experiment, with scores at the end of the experiment for the group induced with a happy mood, $M = 6.35$, ($SD = 1.50$), for those induced with a sad mood, $M = 5.12$, ($SD = 1.95$), and the difference in means being significant, $F(1,68) = 8.61$, $p = .005$.

These results were mirrored by those for the younger subset, where there were 30 people in the happy mood group and 25 in the sad. Analysis of variance showed that mood was successfully manipulated and maintained until the end of the experiment with mean scores for the group induced with a happy mood, $M = 6.55$ ($SD = 1.27$), for the group induced with a sad mood, $M = 5.50$, ($SD = 1.92$), and the difference in means being significant, $F(1,53) = 5.81$, $p = .020$.

Testing Weinstein's (1980) optimistic bias hypothesis

A new *aspect* factor with levels “self” and “typical” formed part of the analysis to test this hypothesis. A 2 (Item type) x 2 (Induced mood) x 2 (Aspect) ANOVA on optimism score from participants rating “self” and “typical” showed that over all items there was a significant main effect for aspect, $F(1,32) = 23.29$, $p < .001$, with mean scores $M(\text{typical}) = 5.52$, ($SD = 0.61$) and $M(\text{self}) = 6.17$, ($SD = 0.88$). Thus Weinstein's optimistic bias for “self” was confirmed, as illustrated in Figure 9.2. This finding for the age inclusive set, was also supported for the younger subset. It is therefore reasonable to examine mood congruence in relation to optimistic bias as did Salovey and Birnbaum (1989).

Testing the major hypotheses: ANOVAs

Analyses were performed on optimism scores for negative and positive health events separately, on optimism scores combined over items of negative, neutral and positive valence, and on the associated response times. Because there were different numbers of positive and negative items in Salovey and Dobber items, rating scores and times were adjusted accordingly for these analyses. Analyses were performed for the age inclusive

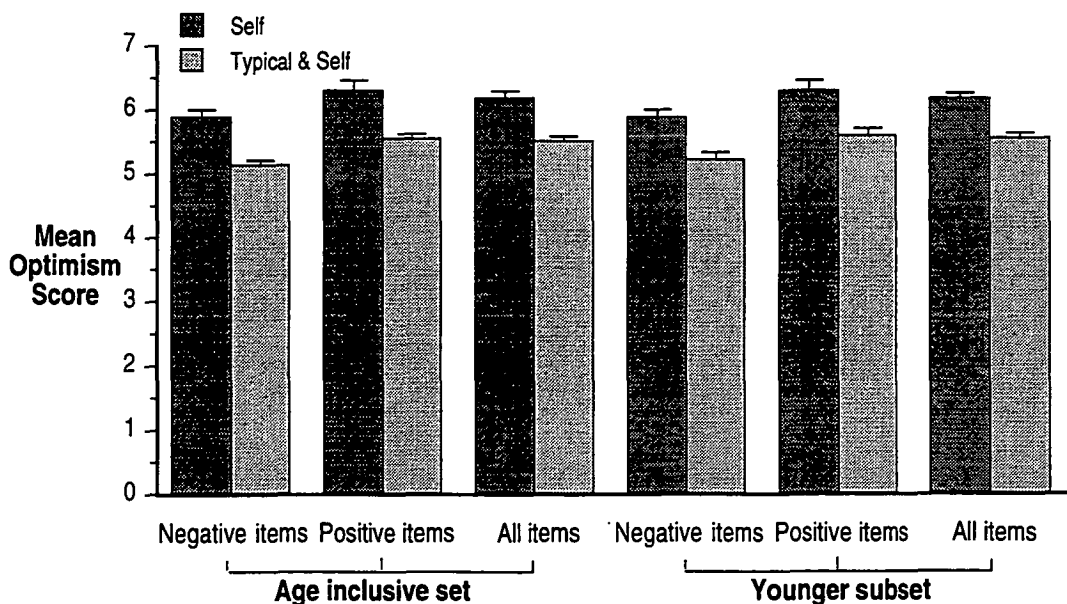


Figure 9.2 Illustration of optimistic bias: Comparison of ratings given to “Self” and to “Typical” by those rating for both. Vertical lines depict standard errors of the means.

set and repeated for the younger subset.

Two kinds of analyses for optimism score for 'self' were made. The first used all available scores from ratings made by the participants about themselves: both by those who responded about themselves only ('self') and by those who responded about themselves as well as about the typical student. Both types of ratings for 'self' were used. The data from participants who responded only about themselves was used as a measure uncontaminated by any anchoring effect of a response about the typical student. The data from participants who responded about themselves was used because it doubled the amount of data available to be examined for mood effects. The purpose of gathering the ratings for the typical student was solely to obtain the optimistic bias scores below, so these "typical student" data were not subjected to separate analysis. The second type of analysis used the data for participants who answered only about themselves. A corresponding response time analysis (response time over all items) was made.

All analyses were ANOVAs of the form, 2 (Item type) x 2 (Induced mood), with item type as a within subjects factor and induced mood a between subjects factor. Optimism score or response time were dependent variables. Results are summarised in tables showing means ratings for mood for the happy and sad induction groups, and *F*-values, degrees of freedom and *p*-values from ANOVAs for both the age inclusive set and the younger subset.

As well as these analyses for optimism score for self, further analyses were run on optimistic bias scores, obtained by subtracting the score given by a participant to the "average" student, from the score given to "self".

Using ratings relating to 'self' items (all participants)

Optimism score on negative health event items

Findings are summarised in Table 9.1.

Table 9.1 Mean Optimism Scores and ANOVA Results for Judgments of Negative Health Event Items for the Self Made by all Participants (Both 'Self only' and 'Typical&self').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	34	6.23	(0.93)	6.31	(0.82)	6.27	(0.87)
Sad	36	6.19	(1.35)	5.72	(1.24)	5.96	(1.31)
ANOVA factors	N	F		p			
Induced mood	70	$F(1,68) = 1.79$		.185			
Item type	70	$F(1,68) = 2.31$		.133			
Item type x Induced mood	70	$F(1,68) = 4.56$		.036*			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	30	6.25	(0.95)	6.34	(0.83)	6.29	(0.88)
Sad	25	5.92	(1.21)	5.47	(1.18)	5.70	(1.20)
ANOVA factors	N	F		p			
Induced mood	55	$F(1,53) = 6.40$		.014*			
Item type	55	$F(1,53) = 1.31$		.258			
Item type x Induced mood	55	$F(1,53) = 2.98$		.090			

Note: * Significant at $p = .05$.

For the age inclusive set, there was a significant interaction between item type and mood shown in Figure 9.3. This interaction can be seen to be due to the lower optimism ratings made by sad mood participants on Salovey items relative to those made on Dobber items.

For the younger subset, however, there was a significant main effect for mood, with lower optimism scores for sad mood participants for which details are given in Table 9.1. That is the younger subset showed mood congruence consistent with Forgas's (1994a) model when items of the Dobber and Salovey types were analysed together.

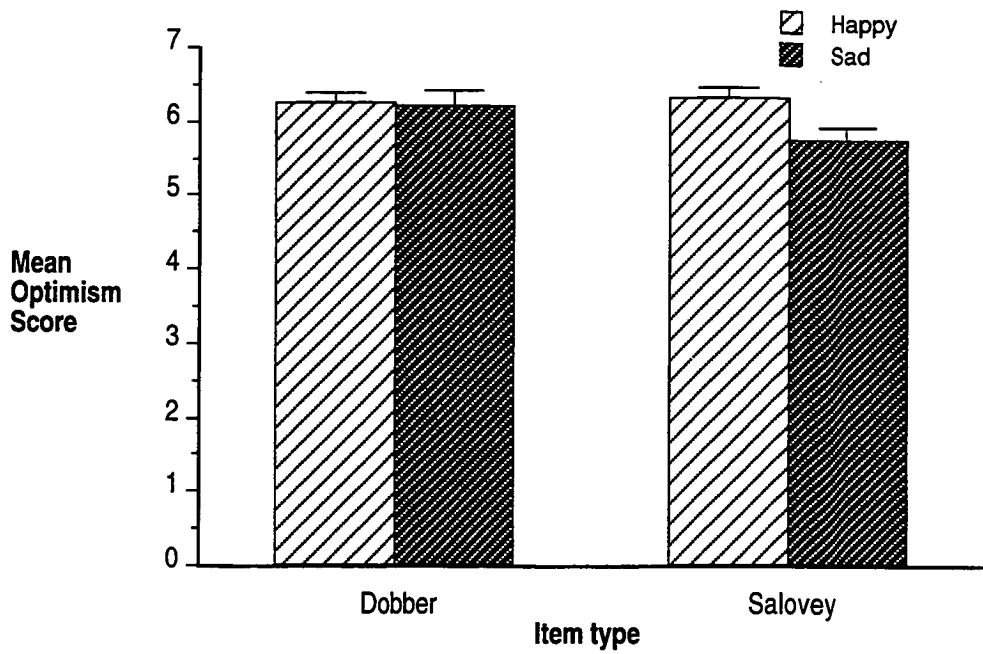


Figure 9.3 Interaction between item type and induced mood for negative items about ‘self’ (adjusted values) with mean optimism score as the dependent variable (age inclusive set). Vertical lines depict standard errors of the means.

Optimism score on positive health event items

Findings are summarised in Table 9.2.

Table 9.2 Mean Optimism Scores and ANOVA Results for Judgments of Positive Health Event Items for the Self Made by all Participants (Both 'Self only' and 'Typical&self').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	34	7.08	(1.16)	6.11	(1.07)	6.59	(1.21)
Sad	36	6.86	(1.50)	6.08	(1.01)	6.47	(1.33)
ANOVA factors	N	F		p			
Induced mood	70	F(1,68) = 0.25		.621			
Item type	70	F(1,68) = 34.54		.001*			
Item type x Induced mood	70	F(1,68) = 0.42		.518			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	30	6.98	(1.20)	6.06	(1.10)	6.52	(1.23)
Sad	25	6.83	(1.37)	5.96	(1.05)	6.40	(1.29)
ANOVA factors	N	F		p			
Induced mood	55	F(1,53) = 0.19		.665			
Item type	55	F(1,53) = 40.51		.001*			
Item type x Induced mood	55	F(1,53) = 0.03		.865			

Note: * Significant at $p = .05$.

For the age inclusive set, ANOVA showed a significant main effect for item type, with more optimistic scores for Dobber items than for Salovey items. For the younger subset, ANOVA likewise showed a significant main effect for item type.

*Total optimism score over all health event items (including those of
'neutral' valence)*

Findings are summarised in Table 9.3.

Table 9.3 Mean Optimism Scores and ANOVA Results for Judgments of All Health Event Items for the Self Made by all Participants (Both 'Self only' and 'Typical&self').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	34	6.79	(0.76)	6.21	(0.67)	6.50	(0.77)
Sad	36	6.65	(1.10)	5.90	(0.90)	6.27	(1.07)
ANOVA factors	N	F		p			
Induced mood	70	F(1,68) = 1.37		.247			
Item type	70	F(1,68) = 71.71		.001*			
Item type x Induced mood	70	F(1,68) = 1.00		.320			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	30	6.75	(0.77)	6.20	(0.68)	6.47	(0.77)
Sad	25	6.51	(0.98)	5.71	(0.82)	6.11	(0.98)
ANOVA factors	N	F		p			
Induced mood	55	F(1,53) = 3.21		.079			
Item type	55	F(1,53) = 59.58		.001*			
Item type x Induced mood	55	F(1,53) = 1.96		.168			

Note: * Significant at $p = .05$.

For the age inclusive set, ANOVA showed a significant main effect for item type, with more optimistic scores for Dobber than for Salovey items. For the younger subset, ANOVA also showed a significant main effect for item type.

Using ratings relating to 'self' items (those answering 'self' items only)

Optimism score on negative health event items

Findings are summarised in Table 9.4.

Table 9.4 Mean Optimism Scores and ANOVA Results for Judgments of Negative Health Event Items ('Self only').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	18	6.41	(0.99)	6.24	(0.81)	6.32	(0.90)
Sad	18	6.63	(1.34)	6.07	(1.17)	6.35	(1.27)
ANOVA factors	N	F		p			
Induced mood	36	F(1,34) = 0.01		.932			
Item type	36	F(1,34) = 3.92		.056			
Item type x Induced mood	36	F(1,34) = 1.07		.309			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	17	6.47	(0.99)	6.21	(0.82)	6.34	(0.91)
Sad	11	6.19	(1.41)	5.66	(1.10)	5.93	(1.27)
ANOVA factors	N	F		p			
Induced mood	28	F(1,26) = 1.43		.242			
Item type	28	F(1,26) = 3.15		.088			
Item type x Induced mood	28	F(1,26) = 0.36		.553			

For the age inclusive set, the main effect for item type fell just short of significance, with a more optimistic score for Dobber items than for Salovey items. Likewise, for the younger subset, item type fell short of significance.

Optimism score on positive health event items

Findings are summarised in Table 9.5.

Table 9.5 Mean Optimism Scores and ANOVA Results for Judgments of Positive Health Event Items ('Self only').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	18	7.45	(0.99)	6.47	(1.04)	6.96	(1.12)
Sad	18	6.88	(1.59)	6.21	(1.14)	6.55	(1.39)
ANOVA factors	N	F		p			
Induced mood	36	F(1,34) = 1.32		.259			
Item type	36	F(1,34) = 22.71		.001*			
Item type x Induced mood	36	F(1,34) = 0.79		.380			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	17	7.42	(1.01)	6.46	(1.07)	6.94	(1.14)
Sad	11	6.29	(1.63)	6.01	(1.37)	6.15	(1.48)
ANOVA factors	N	F		p			
Induced mood	28	F(1,26) = 3.33		.079			
Item type	28	F(1,26) = 9.32		.005*			
Item type x Induced mood	28	F(1,26) = 2.72		.111			

Note: Significant at $p = .05$.

For the age inclusive set, ANOVA showed a significant main effect for item type, with a more optimistic score for Dobber than for Salovey items. For the younger subset, ANOVA also showed a significant effect for item type.

Total optimism score over all health event items (including those of 'neutral' valence)

Findings are summarised in Table 9.6.

Table 9.6 Mean Optimism Scores and ANOVA Results for Judgments of All Health Event Items ('Self only').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	18	6.96	(0.76)	6.35	(0.74)	6.65	(0.80)
Sad	18	6.91	(1.15)	6.14	(0.90)	6.52	(1.09)
ANOVA factors	N	F		p			
Induced mood	36	$F(1,34) = 0.21$		.652			
Item type	36	$F(1,34) = 50.65$		.001*			
Item type x Induced mood	36	$F(1,34) = 0.73$		.400			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	17	6.98	(0.78)	6.33	(0.76)	6.66	(0.82)
Sad	11	6.50	(1.07)	5.83	(0.91)	6.14	(1.02)
ANOVA factors	N	F		p			
Induced mood	28	$F(1,26) = 2.73$		.111			
Item type	28	$F(1,26) = 30.43$		.001*			
Item type x Induced mood	28	$F(1,26) = 0.02$		.898			

Note: Significant at $p = .05$.

For the age inclusive set, ANOVA showed a significant main effect for item type, with more optimistic scores for Dobber than for Salovey items. For the younger subset, ANOVA also showed a significant effect for item type.

Analysis of response time

An analysis corresponding to that for optimism score was made for response time over all items for participants who answered only about themselves.

Findings are summarised in Table 9.7.

Table 9.7 Mean Response Times and ANOVA Results ('Self only').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	18	11.81	(2.75)	5.60	(1.51)	8.71	(3.83)
Sad	18	12.64	(4.33)	5.63	(1.22)	9.14	(4.74)
ANOVA factors	N	F		p			
Induced mood	36	F(1,34) = 0.41		.525			
Item type	36	F(1,34) = 112.91		.001*			
Item type x Induced mood	36	F(1,34) = 0.41		.527			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	17	11.88	(2.82)	5.56	(1.54)	8.72	(3.91)
Sad	11	13.31	(5.211)	5.14	(0.92)	9.22	(5.55)
ANOVA factors	N	F		p			
Induced mood	28	F(1,26) = 0.37		.550			
Item type	28	F(1,26) = 88.54		.001*			
Item type x Induced mood	28	F(1,26) = 1.44		.241			

Note: Significant at $p = .05$.

For both the age inclusive set and the younger subset, ANOVAs showed a significant main effect for item type, with the longer Dobber items, as expected, taking longer than those of Salovey.

Using ratings made by participants about themselves and the typical student:

Analysis of optimistic bias score

The optimistic bias score was obtained by subtracting the score given by a participant to the 'average' student from the score given to 'self'.

Optimism score on negative health event items

Findings are summarised in Table 9.8.

Table 9.8 Mean Optimistic Bias Scores and ANOVA Results for Judgments of Negative Health Event Items ('Typical&self').

Age inclusive set								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	16	1.09	(0.94)	0.77	(0.75)	0.93	(0.85)	
Sad	18	1.08	(1.11)	0.13	(0.94)	0.61	(1.12)	
ANOVA factors	N	F		p				
Induced mood	34	F(1,32) = 1.16		.289				
Item type	34	F(1,32) = 25.87		.001*				
Item type x Induced mood	34	F(1,32) = 6.16		.019*				
Younger subset								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	13	0.77	(0.61)	0.62	(0.57)	0.70	(0.59)	
Sad	14	1.19	(1.05)	0.17	(0.90)	0.68	(1.09)	
ANOVA factors	N	F		p				
Induced mood	27	F(1,25) < 0.01		.967				
Item type	27	F(1,25) = 19.91		.001*				
Item type x Induced mood	27	F(1,25) = 10.80		.003*				

Note: Significant at $p = .05$.

For the age inclusive set, ANOVA showed a significant main effect for item type, and a significant interaction between item type and mood. Figure 9.4 shows that this interaction resulted particularly from a greater effect of mood on optimistic bias for Salovey items. For the younger subset a similar pattern was obtained (Figure 9.5). A comparison between the graphs shows that in this case scores on the Dobber items were relatively lower for the group induced with a happy mood than for the corresponding group in the age inclusive set.

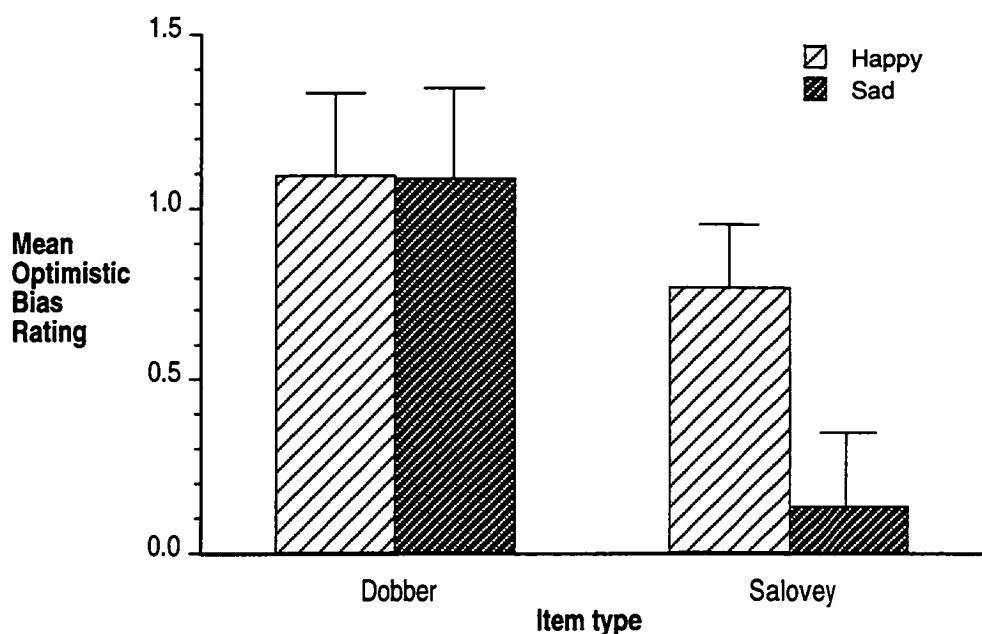


Figure 9.4 Interaction between item type and induced mood for negative health event items with optimistic bias score as the dependent variable (age inclusive set). Vertical lines depict standard errors of the means.

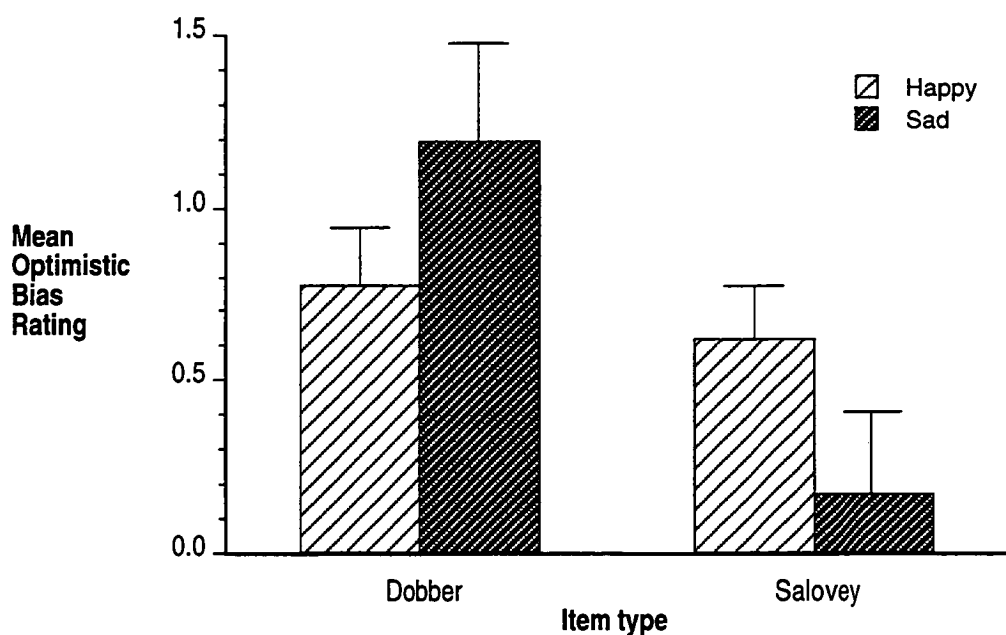


Figure 9.5 Interaction between item type and induced mood for negative health event items with optimistic bias score as the dependent variable (younger subset). Vertical lines depict standard errors of the means.

Optimism score on positive health event items

Findings are summarised in Table 9.9.

Table 9.9 Mean Optimistic Bias Scores and ANOVA Results for Judgments of Positive Health Event Items ('Typical&self').

Age inclusive set								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	16	1.03	(1.24)	0.72	(1.07)	0.87	(1.15)	
Sad	18	0.72	(1.25)	0.62	(0.97)	0.67	(1.10)	
ANOVA factors	N	F		p				
Induced mood	34	F(1,32) = 0.39		.536				
Item type	34	F(1,32) = 0.91		.347				
Item type x Induced mood	34	F(1,32) = 0.26		.614				
Younger subset								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	13	0.62	(0.50)	0.60	(0.82)	0.61	(0.66)	
Sad	14	1.01	(1.08)	0.66	(0.84)	0.84	(0.96)	
ANOVA factors	N	F		p				
Induced mood	27	F(1,25) = 0.70		.410				
Item type	27	F(1,25) = 1.12		.300				
Item type x Induced mood	27	F(1,25) = 0.86		.362				

Analysis of variance showed no significant effects for either the whole (age inclusive) set or for the younger subset.

*Total optimistic bias score over all health event items (including those of
'neutral' valence)*

Findings are summarised in Table 9.10.

Table 9.10 Mean Optimistic Bias Scores and ANOVA Results for Judgments of All Health Event Items ('Typical&self').

Age inclusive set								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	16	0.83	(0.88)	0.74	(0.76)	0.79	(0.81)	
Sad	18	0.69	(0.95)	0.38	(0.89)	0.53	(0.92)	
ANOVA factors	N	F		p				
Induced mood	34	F(1,32) = 0.88		.354				
Item type	34	F(1,32) = 2.56		.120				
Item type x Induced mood	34	F(1,32) = 0.77		.386				
Younger subset								
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)		
Happy	13	0.53	(0.37)	0.61	(0.45)	0.57	(0.41)	
Sad	14	0.88	(0.84)	0.41	(0.78)	0.65	(0.83)	
ANOVA factors	N	F		p				
Induced mood	27	F(1,25) = 0.13		.724				
Item type	27	F(1,25) = 2.92		.100				
Item type x Induced mood	27	F(1,25) = 5.79		.024*				

Note: Significant at $p = .05$.

For the whole (age inclusive) set ANOVA showed no significant effects. However for the younger subset there was a significant interaction between item type and induced mood. Figure 9.6 shows that responses on Dobber items for participants induced with a sad mood showed greater optimistic bias than those from any of the other groups.

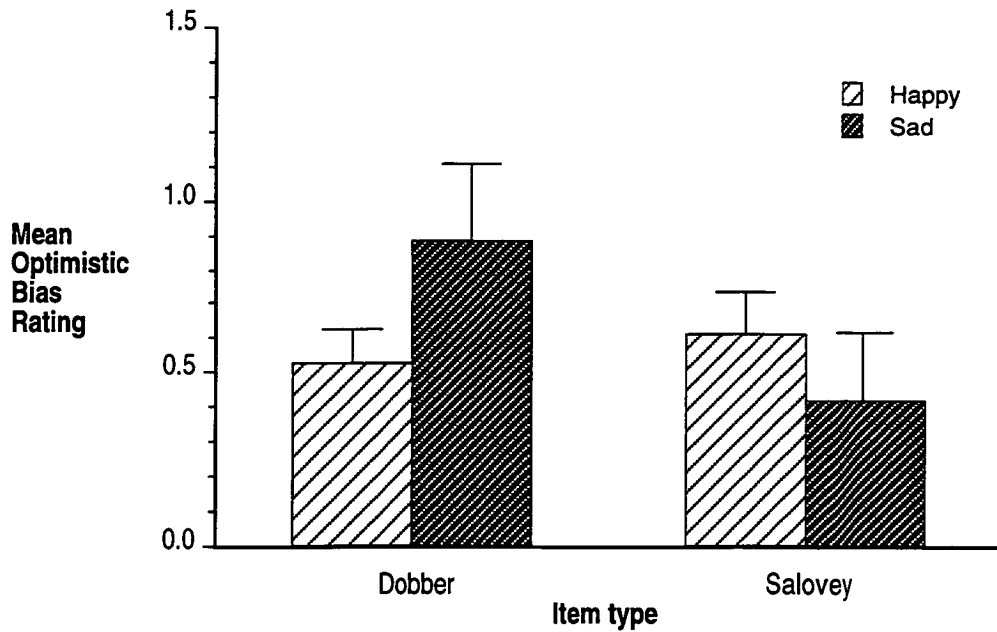


Figure 9.6 Interaction between item type and induced mood for all health event items with optimistic bias score as the dependent variable (younger subset). Vertical lines depict standard errors of the means.

Analysis of response time

Findings are summarised in Table 9.11.

Table 9.11 Mean Response Times per Item and ANOVA Results ('Typical&self').

Age inclusive set							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	16	9.67	(2.46)	4.89	(1.01)	7.27	(3.05)
Sad	18	8.92	(2.46)	4.79	(1.30)	6.86	(2.85)
ANOVA factors	N	F		p			
Induced mood	34	F(1,32) = 0.68		.417			
Item type	34	F(1,32) = 107.11		.001*			
Item type x Induced mood	34	F(1,32) = 0.56		.461			
Younger subset							
Mood	N	Dobber Mean (SD)		Salovey Mean (SD)		Both Mean (SD)	
Happy	13	9.78	(2.68)	4.75	(1.04)	7.26	(3.25)
Sad	14	8.77	(2.69)	4.49	(0.99)	6.63	(2.95)
ANOVA factors	N	F		p			
Induced mood	27	F(1,25) = 1.09		.307			
Item type	27	F(1,25) = 89.24		.001*			
Item type x Induced mood	27	F(1,25) = 0.57		.457			

Note: Significant at $p = .05$.

For both the age inclusive and the younger subset ANOVAs there was a significant main effect for item type, with greater time taken by the longer Dobber compared with Salovey items.

Post-experimental questionnaires yielded no information suggesting any issues warranting further consideration.

Summary and discussion of results of ANOVAs

First hypothesis

The first hypothesis was that people in a sad mood would make more pessimistic judgments than those in whom a happy mood was induced. This hypothesis was supported in only one instance. There was a main effect for mood when analysing negative ratings about the self on 'self only' items for the younger subset when both 'self' and 'typical and self' items were analysed together (cf. Tables 9.1, 9.13). There was no other statistically significant support for this hypothesis.

However there were four instances of statistically significant interactions between mood and item type out of the eighteen investigated. The optimism score on negative health events on all 'self' ratings by the age inclusive set of participants in a sad mood was significantly lower on Salovey than on Dobber items (cf. Table 9.1). The optimistic bias score on negative health events on negative health events by participants (for both the age inclusive set and the younger subset) showed significantly more optimism on Dobber than on Salovey items (cf. Table 9.8). The optimistic bias score over all health events for the younger subset showed a significantly greater optimistic bias of sad mood participants on Dobber items than of: sad mood participants on Salovey items, happy mood participants on Salovey items, or happy mood participants on Dobber items (cf. Table 9.10).

Second hypothesis

The second hypothesis was that people in an induced sad mood would process information more slowly than those in a happy induced mood. No significant effects of mood on response time were found and therefore the second hypothesis was unsupported.

Correlations

Because ambient mood might be more pervasive than induced mood, correlational analyses were run (cf. Salovey & Birnbaum, 1989) between final mood and:

- (i) optimism scores: 'self' over all participants, 'self' over participants with 'self' items only and optimistic bias scores (self - typical) derived from participants with 'self' and 'average' items, were run for judgments *and also for*
- (ii) response times (total).

All correlations were run for both the age inclusive set and the younger subset. As the hypotheses that mood rating would correlate positively with optimism scores and negatively with response time were directional, the tests of significance were one-tailed. Results are shown in Table 9.12.

These correlations of individual mood ratings with corresponding (i) optimism and optimistic bias scores, and with (ii) response time show the following. Firstly, for both the age inclusive set and younger subset, there was a significant correlation between actual mood and optimism score over all ratings participants made for themselves ('self') on negative items which resulted also in significant correlations over all items (positive and negative combined). Secondly, Salovey and Birnbaum's (1989, Experiment 3) findings were supported for both the age inclusive set and the younger subset. Mood congruence was thus demonstrated for optimistic bias about negative

health events. This resulted also in a significant correlation over all items, that is, over negative, neutral and positive combined.

Table 9.12 Correlations of Final Mood with Optimism Scores and Response Times.

<i>Age inclusive set</i>						
Scores for: Participants answering:	<i>Salovey items</i>			<i>Dobber items</i>		
	'Self' any 'Self' items	'Self' 'Self only' items	Optimistic bias 'Typical&self' items	'Self' any 'Self' items	'Self' 'Self only' items	Optimistic bias 'Typical&self' items
Final mood						
<i>df</i>	68	34	32	68	34	32
<i>Negative items</i>	.31*	.19	.34*	.16	.05	.10
<i>Positive items</i>	.10	.19	.26	.12	.33*	-.02
<i>All items</i>	.28*	.25	.33*	.17	.16	.08
<i>r (critical value)</i>	.19	.27	.29	.19	.27	.29
Response times						
<i>df</i>	n/a	34	32	n/a	34	32
<i>Time</i>	n/a	.21	-.25	n/a	-.37*	-.09
<i>r (critical value)</i>	n/a	.27	.29	n/a	.27	.29
<i>Younger subset</i>						
Scores for: Participants answering:	<i>Salovey items</i>			<i>Dobber items</i>		
	'Self' any 'Self' items	'Self' 'Self only' items	Optimistic bias 'Typical&self' items	'Self' any 'Self' items	'Self' 'Self only' items	Optimistic bias 'Typical&self' items
Final mood						
<i>df</i>	53	26	25	53	26	25
<i>Negative items</i>	.35*	.32*	.53*	.22*	.19	.11
<i>Positive items</i>	.16	.31	.24	.18	.45*	-.13
<i>All items</i>	.35*	.40*	.47*	.22*	.32*	-.01
<i>r (critical value)</i>	.22	.312	.32	.22	.32	.32
Response times						
<i>df</i>	n/a	26	26	n/a	26	25
<i>Time</i>	n/a	.19	.04	n/a	-.59*	-.23
<i>r (critical value)</i>	n/a	.32	.32	n/a	.32	.32

Note: * Significant at $p = .05$.

For the younger subset only, there were also significant correlations between mood for each of (a) 'self', (b) all participants for 'self' on 'self only' items, and (c) optimistic bias score, (which resulted in significant correlations in each case when negative and positive items were combined).

For the predictions of the AIM for substantive processing to be supported in any way, optimism scores should be negatively correlated with the time taken to make judgments. There was a non-significant trend in this direction only for “typical&self” items, demonstrated for the age inclusive set (but not for the younger subset). Separating response timing of negative and positive items would help elucidate the matter further, but these data were not collected separately.

The results on the items used in the present study for the age inclusive analysis differ from those obtained by Salovey and Birnbaum (1989, Experiment 3). There was a significant correlation for both the age inclusive set and the younger subset between ‘self’ (when participants were asked only about themselves) and mood, on positive items. The results for the younger subset showed an even stronger correlation between optimism score and mood for ‘self’ on positive items (resulting also in a significant correlation for ‘self’ on all items). For the younger subset there were also significant correlations between optimism score and mood for ‘self’ on negative items and over all items.

The correlations for time are also interesting. The negative correlations between mood and time taken on ‘self only’ items (by both the age inclusive set and younger subset) and on both ‘self only’ and ‘typical&self’ for the younger subset would accord with the AIM (although the only corresponding optimism score reaching significance was for ‘self’ on ‘Self only’ items).

Summarising these findings in relation to Forgas’s AIM: for both the age inclusive set and the younger subset, there was a significant correlation between mood and optimism score (positive items) paralleled by a significant correlation between mood and time (over all item valences) for ‘self only’ items.

Again separate response timing of negative and positive items would help elucidate the matter further.

Summary and Conclusions

Results of Experiment 7 correlations have already been summarised in Table 9.12. For ease of reference previously presented results of mood main effects in Experiment 7 ANOVAs are summarised in Table 9.13.

Table 9.13 Summary of Mood Main Effects in Experiment 7 ANOVAs

	<i>N (age inclusive)</i>	<i>p</i>	<i>N(younger subset)</i>	<i>p</i>
<i>Analyses of all participants</i>				
Optimism score - neg items about self	70	.185	55	.014 *
Optimism score - pos items about self	70	.621	55	.665
Optimism score - all items about self	70	.247	55	.079
<i>Analyses of participants answering "self" items only</i>				
Optimism score - neg items about self	36	.932	28	.242
Optimism score - pos items about self	36	.259	28	.079
Optimism score - all items about self	36	.652	28	.111
Response time	36	.525	28	.550
<i>Analyses of participants answering 'self and 'typical items.</i>				
Optimistic bias - negative items	34	.289	27	.967
Optimistic bias - positive items	34	.536	27	.410
Optimistic bias - all items	34	.354	27	.724
Response time	34	.417	27	.307

Note: * Significant at $p = .05$.

Variables: Induced mood (Happy, Sad)
Item type (Dobber, Salovey)

Induced mood, optimism scores and response time

There was some confirmation of Salovey and Birnbaum's (1989) findings that healthy participants in a sad mood would make more pessimistic judgments than those in a happy mood. There were also indications that scores on the items of this study were responded to differently from those of Salovey and Birnbaum's study, with participants in a sad mood responding more optimistically on the former than on the latter. There were no significant effects for mood on response time. It was decided that separate times for responses to positive and negative items would be measured in the next experiment.

Ambient mood, optimism score and response time

Ambient mood and optimism score

For Salovey items there was more indication of mood/optimism score congruence. Firstly Salovey and Birnbaum's findings of optimistic bias for negative health events was confirmed. Furthermore there was a significant correlation between mood and optimism score for ratings for the self (that is, an effect on the score, rather than on a relative score as with optimistic bias). Also, there was some evidence of mood congruence for positive items in the younger subset for 'self'. However no causality can be inferred without mood manipulation.

For Dobber items there was also evidence of some mood/optimism score congruence, but not for optimistic bias on negative items, as would have been expected on the basis of Salovey and Birnbaum (1989, Experiment 3). Similarly to the above findings on Salovey items, there was a correlation between mood and optimism score on negative items for 'self'. As opposed to Salovey type items, there was a correlation between mood and score for 'self' from those who responded for 'self only', on positive items.

Ambient mood and response time.

For both Salovey and Dobber items there was some indication that response time might correlate negatively with optimism score, as proposed by Forgas's AIM. This could be clarified by separate measures of response time for negative and positive items.

Chapter 10

Experiment 8: Mood Influence on Positive and Negative Health Events, varying Item Type and Item Target

Chapter 10

Experiment 8: Mood Influence on Positive and Negative Health Events, varying Item Type and Item Target

Experiment 7 provided some degree of confirmation of Salovey and Birnbaum's finding of mood congruence in health judgments made by healthy people. Not only was clarification of this required, but there was also a need for separate timing of responses for negative and positive items for confirmation of Forgas's AIM. An experiment was therefore run to allow a comparison of items of the Salovey and Birnbaum (1989) type with those of this study. A shortened version of the Dobber items was also incorporated, in case, for whatever reason, mood effects might occur only with shorter items – the original Dobber items were longer than those used by Salovey and Birnbaum (1989). 'Neutral' valenced Dobber items were not incorporated as they were considered unnecessary to settle the present issues.

This experiment can best be conceptualised as involving the running of 4 sub-experiments under similar conditions: participants were recruited together, the same mood inductions were used and conditions were as similar as possible. Participants were allocated to one of the 4 sub-experiments. These sub-experiments or quadrants, as shown in Table 10.1, were determined by

- (i) item type: whether of the type used by Salovey and Birnbaum (1989) (referred to below as *Salovey*) or of the type developed for this study (*Dobber*) and
- (ii) item target: whether participants were asked only about themselves ('self') or first about the typical student and then about themselves ('typical&self').

In all four sub-experiments the items were presented to each participant in two categories: one category related to positive health events and the other related to

negative health events. All questionnaires contained an equal number of positive and negative items with item order (positive or negative first) counterbalanced across the design. Total times were recorded, (i) for responses to items relating to negative health events and (ii) for responses to items relating to positive health events.

Table 10.1 The Four Quadrants of Experiment 8.

<i>Item type: Dobber</i>											
<i>First Quadrant – Item target: Self</i>						<i>Second Quadrant – Item target: Typical & self</i>					
<i>Group</i>	<i>Induced mood</i>	<i>First</i>	<i>Age</i>	<i>Cue</i>	<i>N</i>	<i>Group</i>	<i>Induced mood</i>	<i>First</i>	<i>Age</i>	<i>Cue</i>	<i>N</i>
A	H	+	in	in	4	A	H	+	in	in	4
B	H	+	in	out	4	B	H	+	in	out	4
C	H	+	out	in	4	C	H	+	out	in	4
D	H	+	out	out	4	D	H	+	out	out	4
E	H	-	in	in	4	E	H	-	in	in	4
F	H	-	in	out	4	F	H	-	in	out	4
G	H	-	out	in	4	G	H	-	out	in	4
H	H	-	out	out	4	H	H	-	out	out	4
I	S	+	in	in	4	I	S	+	in	in	4
J	S	+	in	out	4	J	S	+	in	out	4
K	S	+	out	in	4	K	S	+	out	in	4
L	S	+	out	out	4	L	S	+	out	out	4
M	S	-	in	in	4	M	S	-	in	in	4
N	S	-	in	out	4	N	S	-	in	out	4
O	S	-	out	in	4	O	S	-	out	in	4
P	S	-	out	out	4	P	S	-	out	out	4
<i>Total (16M, 48F):</i>					64	<i>Total (16M, 48F):</i>					64

<i>Item type: Salovey</i>											
<i>Third Quadrant – Item target: Self</i>						<i>Fourth Quadrant – Item target: Typical & self</i>					
<i>Group</i>	<i>Induced mood</i>	<i>First</i>	<i>Age</i>	<i>Cue</i>	<i>N</i>	<i>Group</i>	<i>Induced mood</i>	<i>First</i>	<i>Age</i>	<i>Cue</i>	<i>N</i>
A	H	+	n/a	n/a	12	A	H	+	n/a	n/a	12
B	H	-	n/a	n/a	12	B	H	-	n/a	n/a	12
C	S	+	n/a	n/a	12	C	S	+	n/a	n/a	12
D	S	-	n/a	n/a	12	D	S	-	n/a	n/a	12
<i>Total (9M, 39F):</i>					48	<i>Total (13M, 36F):</i>					48

<i>Note.</i>	<i>Key:</i>	Ind. mood (H, S)	= Induced mood (Happy, Sad)
		First (+, -)	= Items presentation order (Positive first, Negative first)
		Age (in, out)	= Age reference included or excluded
		Cue (in, out)	= prefatory statement ("Given your current and likely future behaviour...") included or excluded

All Salovey items were of a similar type, asking for likelihood ratings on situations such as “contracting some form of cancer” – an example of a negative item, or “regularly maintaining an exercise program” – an example of a positive item.

Dobber positive items were of the type, “What do you believe would be your chances of (initiating *or* maintaining some specific beneficial health behaviour) over the next six months if you decided to?”

Dobber negative items were of four types, based on two between subjects factors, depending on whether or not a cue or an age was included. That is, the structure of a Dobber negative item was:

Cue (sometimes present): *Given your current and likely future behaviour...*

Stem (always present): *...how likely do you think is the (specified) outcome...*

Age (sometimes present): *...before the age of 70?*

Hence, examples of Dobber negative item variants (this one relating to exposure to the sun) were:

- (i) “Given your current and likely future exposure to the sun, how likely do you think you are to contract skin cancer before the age of 70?” (Cue included, age included).
- (ii) “How likely do you think you are to contract skin cancer before the age of 70?” (Cue excluded, age included).
- (iii) “Given your current and likely future exposure to the sun, how likely do you think you are to contract skin cancer?” (Cue included, age excluded).
- (iv) “How likely do you think you are to contract skin cancer?” (Cue excluded, age excluded).

For Dobber items related to negative health events, the presence of cue and age was thus varied to make the items progressively more similar in nature and word length to the Salovey items. Salovey & Birnbaum (1989) had asked participants to make

likelihood ratings of experiencing particular situations over the lifespan, for issues such as “Contracting some form of cancer”. Salovey items (positive and negative), and Dobber positive items, were not varied in any way in this experiment.

This overall experiment, then, was designed to clarify a number of issues:

- (i) Where, across the overall design, were mood effects to be found, if at all?
- (ii) Did mood effects, if established, relate to the time taken to process information as predicted by Forgas’s Affect Infusion Model?

Hypotheses

Preliminary hypothesis

As for Experiment 7, a preliminary hypothesis was that participants who made ratings for a typical student as well as themselves would exhibit an optimistic bias for themselves in their health ratings (Weinstein, 1980) .

Major hypotheses

The major hypotheses, based on Forgas’s Affect Infusion Model, were that participants in whom a sad mood was induced would

- (i) make more pessimistic judgments

and

- (ii) process information more slowly

than those in a whom a happy mood was induced.

Based on Salovey and Birnbaum’s (1989) findings, this was expected to apply at least when both of the following conditions were satisfied:

- (i) judgments were made in relation to negative health events
- (ii) participants were asked to rate their prospects compared with those of the average university student.

Method

Participants

Participants were 224 university students, 54 males and 170 females, of mean age 23.12 ($SD = 8.32$) recruited to participate in a 'health judgments study'.

Design

The whole experiment was conceived in terms of a $2 \times 2 \times 2$ design with overarching factors of mood induction (happy, sad), item type (Dobber, Salovey) and presence or absence of typical student items (typical&self, self only). However, as already indicated in the introduction to this chapter, and further explained below, there were some differences between the Dobber and Salovey item types. Sex (male, female) was also analysed across the whole design. The order of presentation of items (positive health event first, negative health event first) was counterbalanced. All other factors were between subjects factors. Within the half of the experiment involving the 'Dobber items' there were two additional between subjects factors (as described above):

cue given your current behaviour (cue included, cue excluded) *and*
age by the age of 70 (age included, age excluded).

The dependent variables

The dependent variables were:

- (i) optimism scores on negative items
- (ii) response times for negative items
- (iii) optimism scores on positive items *and*
- (iv) response times for positive items.

In this experiment optimism scores were summed for analyses, whereas in the previous experiment average optimism scores were necessarily used because adjustments needed to be made to allow for differences in the number of items.

Mood induction and manipulation checks

Moods were induced using the autobiographical method as in Experiments 2 and 7. Mood ratings were made on a 9-point scale embedded among other distractor scales, as in previous experiments. To rule out the possibility of mood awareness and compliance effects, participants' mood ratings were requested only after the health ratings had been made, as for Experiment 7.

Apparatus and materials

Participants were given their own sets of questionnaires, each consisting of a numbered consent form, and an 'Autobiographical Memory Inventory' (for happy or sad mood induction) with one and a half pages of lined paper. This was followed by a general set of instructions for what was presented as another study entitled 'A Health Ratings Experiment' followed by experiment-specific instructions for responding to likelihood scales. Differences in instructions related (i) to differences in item type (Dobber or Salovey) with instructions written to fit the items asked, and (ii) to fit the varieties of item target (depending on whether participants were asked to respond for the average student and then for themselves or just for themselves). Then followed some pages of health statements, each statement having a rating scale next to it. An instruction at the beginning and end of items relating to positive health events and similarly to negative health events asked participants to "note down the time from the display clock" in a specially marked space. On the penultimate page participants were asked "Please read the following word pairs and mark, with a line through the scale, the position on the scale that refers to you at this moment". The scales were *alert - drowsy*, *sad - happy* and *dreamy - attentive*, all with 9 major points. Then followed a post-experimental questionnaire. Copies of protocols for this experiment form Appendix F.

The experimenter used a stop-watch to measure the ten minute mood induction period, that is the time participants were allowed to complete the Autobiographical Memory

Inventory. Participants made their recordings of time from a video-screened film of a digital clock situated a few metres in front of them.

Procedure

The procedure for this Experiment 8 was exactly as for Experiment 7, except that this time no Health Inventory was administered.

Results and Discussion

Preliminary analyses

Age distribution across cells

A 2 (Sex) x 2 (Item type) x 2 (Item target) x 2 (Mood induction) ANOVA was run on data from the whole experiment to examine age distribution across the cells of the design, with age as the dependent variable. Although random allocation to groups was expected to ensure an even spread of ages between them, there was a significant interaction (shown in Figure 10.1) between mood and sex, $F(1,208) = 4.82$, $p = .029$, with mean ages and standard deviations:

sad males	$M = 24.54$ years ($SD = 7.74$)
happy females	$M = 24.13$ years ($SD = 9.00$)
sad females	$M = 22.30$ years ($SD = 8.57$)
happy males	$M = 20.92$ years ($SD = 4.51$)

However means comparisons (contrast analysis) showed that no mean for any mood/sex group was significantly different from any other.

As there was the same problem of significant differences between ages for the groups as there had been for Experiment 7, the same way of dealing with the data was chosen. That is, a decision was made to present results both for all participants (age inclusive set), and for participants aged less than 25 (younger subset), where there was no significant difference in age between the mood/sex groups, to provide a check on age

effects. All significant findings are reported but in the interests of clarity, findings are given in detail only for the age inclusive set, with only results relating to the hypotheses (that is those relating to mood) or otherwise considered important, being given in detail for the subset of younger participants.



Figure 10.1 Interaction of sex and induced mood with age (all participants). Vertical lines depict standard errors of the means.

Mood manipulation/retention check

Analyses for effectiveness of the mood manipulation/retention were carried out over all four quadrants combined and for each quadrant separately.

Analyses of variance were performed on mood ratings across all four quadrants to test the hypothesis that the mood induction was effective. Similar mood analyses were run for each of the quadrants. Results of analyses are shown in Table 10.2 (age inclusive set and younger subset.)

Table 10.2 Results of Mood Inductions Checks.

Analyses		Mean mood rating		F value	p-value
		Happy Mean (SD)	Sad Mean (SD)		
Age inclusive	All 4 quadrants	6.09 (1.52)	4.95 (1.65)	$F(1,222) = 28.77$	<.001 *
	Dobber (self only)	6.01 (1.62)	4.92 (1.71)	$F(1,62) = 6.76$	.012 *
	Dobber (typical&self)	5.87 (1.57)	4.88 (1.38)	$F(1,62) = 7.24$	.009 *
	Salovey (self only)	6.48 (1.19)	4.81 (1.48)	$F(1,46) = 18.49$	<.001 *
	Salovey (typical&self)	6.08 (1.60)	5.23 (2.07)	$F(1,46) = 2.56$	.116
Younger subset	All 4 quadrants	6.09 (1.42)	4.89 (1.61)	$F(1,171) = 27.03$	<.001 *
	Dobber (self only)	5.86 (1.70)	4.74 (1.66)	$F(1,50) = 5.77$	.020 *
	Dobber (typical&self)	6.30 (1.00)	4.73 (1.38)	$F(1,43) = 18.50$	<.001 *
	Salovey (self only)	6.41 (1.14)	4.87 (1.54)	$F(1,38) = 12.98$	.001 *
	Salovey (typical&self)	5.81 (1.66)	5.37 (1.93)	$F(1,34) = 0.54$	.467

Note: saddest = 1 and happiest = 9

* Significant at $p = .05$.

Mood induction/maintenance across all the quadrants

For both the age inclusive set and the younger subset, it can be seen that across all quadrants combined there was a highly significant difference between happy and sad induction participants on post-questionnaire mood ratings. That is, not only were happy and sad moods effectively induced, but they were also maintained for the health judgments period.

Mood induction/maintenance across individual quadrants

Likewise for the quadrants Dobber: self only, Dobber: typical&self, Salovey: self only, happy and sad moods were apparently successfully induced and maintained. However for the Salovey: typical&self quadrant, although the mean rating for the happy mood group was similar to that for the other quadrants and this mood was maintained, the mean rating for the sad mood group indicated that either the sad mood induction was ineffective for these participants, or more probably that the mood induced was not maintained as well as in the other three groups.

In summary, for both the age inclusive set and the younger subset, induced mood was successfully induced and maintained in all but the Salovey typical&self quadrant where differences, although in the direction of the manipulation, were not significant.

Testing Weinstein’s (1980) optimistic bias hypothesis

A 2 (Item type) x 2 (Induced mood) x 2 (Aspect) ANOVA, with ratings for typical student/self being the levels of the repeated measures *aspect* factor on optimism score as the dependent variable showed that over all items there was a significant main effect for aspect, $F(1,104) = 71.26, p < .001$, with mean scores M (typical) = 84.33 ($SD = 11.32$) and M (self) = 95.28 ($SD = 12.31$). There was also an interaction for Aspect x Sex x Item type, $F(1,104) = 5.98, p = .016$, a consequence of a large optimistic bias displayed by males on Salovey items. That is Weinstein’s optimistic bias for the self was confirmed. An optimistic bias was also found for the younger subset, this time without any interaction. Figure 10.2 depicts the optimistic bias exhibited in Experiment 8.

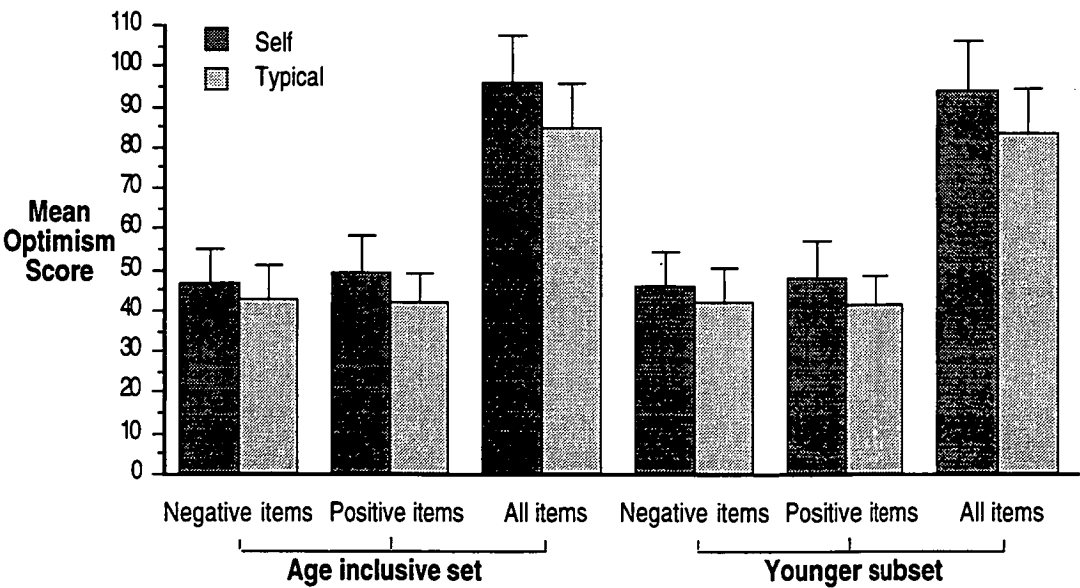


Figure 10.2 Mean scores for negative, positive and all items, comparing responses of participants answering the ‘self’ as well as the ‘typical’ items. Vertical lines depict standard errors of the means.

In summary the optimistic bias effect was confirmed. It was therefore reasonable to examine mood congruence in relation to optimistic bias as did Salovey and Birnbaum (1989).

Testing the major hypotheses: ANOVAs

To test the major hypotheses, appropriately grouped data were analysed across the quadrants of the experiment. A summary of results is given in Table 10.3, followed by more detail of the analyses. Results for the age inclusive set were mirrored by those for

Table 10.3 Significant Effects (at .05 level) in Experiment 8 ANOVAs.

<i>'Self' data from all quadrants</i>				
<i>Participants: DV:</i>	<i>All* Optimism score</i>		<i>Short items** Optimism score</i>	
<i>Negative (Age inclusive)</i>	Sex x Item target	$p = .048$	Item target	$p = .009$
			Sex x Item type	$p = .035$
<i>Negative (Younger subset)</i>	No significant effects		Item target	$p = .048$
			Sex x Item type	$p = .031$
<i>Positive (Age inclusive)</i>	Sex x Item type	$p = .009$	Item target	$p = .036$
			Sex x Item target	$p = .028$
<i>Positive (Younger subset)</i>	Sex x item type	$p = .033$	Item target	$p = .005$
	Sex x Item target	$p = .034$	Sex x Item target	$p = .026$
<i>'Self & typical' data from the two relevant quadrants</i>				
<i>Participants: DV:</i>	<i>All* Optimistic bias score</i>		<i>Short items** Optimistic bias score</i>	
<i>Negative (Age inclusive)</i>	No significant effects		No significant effects	
<i>Negative (Younger subset)</i>	No significant effects		No significant effects	
<i>Positive (Age inclusive)</i>	Item type	$p = .029$	No significant effects	
	Sex x item type	$p = .020$		
<i>Positive (Younger subset)</i>	No significant effects		No significant effects	
<i>Participants: DV:</i>	<i>All* Response time</i>		<i>Short items** Response time</i>	
<i>Negative (Age inclusive)</i>	Item type	$p = .015$	No significant effects	
<i>Negative (Younger subset)</i>	No significant effects		No significant effects	
<i>Positive (Age inclusive)</i>	Item type	$p = .010$	Item type	$p = .015$
<i>Positive (Younger subset)</i>	Sex	$p = .038$	Sex	$p = .002$
			Item type	$p = .001$
			Sex x item type	$p = .024$

Note. No effects involving mood as a main effect or interaction were obtained by any of the above analyses.

* All: i.e. all subjects in the relevant quadrant.

** Short items: i.e. all subjects answering Salovey items or the shortest Dobber items (cue excluded, age excluded type).

the younger subset. As indicated in Table 10.3 there were no significant main effects or interactions involving mood, for any of: optimism score, optimistic bias score or response time as dependent variables. Hence, there was no support for the hypothesis that participants in whom a sad mood was induced would make more pessimistic health judgments than those in whom a happy mood was induced. Nor was there any support for the hypothesis that those in whom a sad mood was induced would process information more slowly than those in whom a happy mood was induced. These findings applied for both negative and positive health judgments. Hence Forgas's Affect Infusion Model was not upheld for these health judgments with induced sad and happy moods.

Analyses of self data only across all quadrants

Analyses across all items of all four quadrants

In accordance with the principle of analysing whenever possible over the whole experiment, the self data were analysed across the whole design in a 2 (Sex) x 2 (Item type) x 2 (Mood induction) x 2 (Item target) ANOVA. Optimism scores derived from items relating to negative events and optimism scores derived from items relating to positive health events and the corresponding response times were dependent variables in separate analyses. Results are presented for the age inclusive set followed by the younger subset.

Optimism on negative health event items

For the age inclusive set, there were no significant main effects, but there was a significant interaction between sex and item target, $F(1,208) = 3.96, p = .048$. As can be seen in Figure 10.3, males who made a rating for the typical student as well as for themselves were more optimistic about their own health than were any of the other groups. Comparison of means showed statistically significant differences between optimism scores for male self compared with male typical&self ($p = .029$), male typical&self compared with female typical&self ($p = .032$) and male typical&self

compared with female self ($p = .038$). For the younger subset there were no significant effects. The interaction between sex and item target just failed to reach significance here.

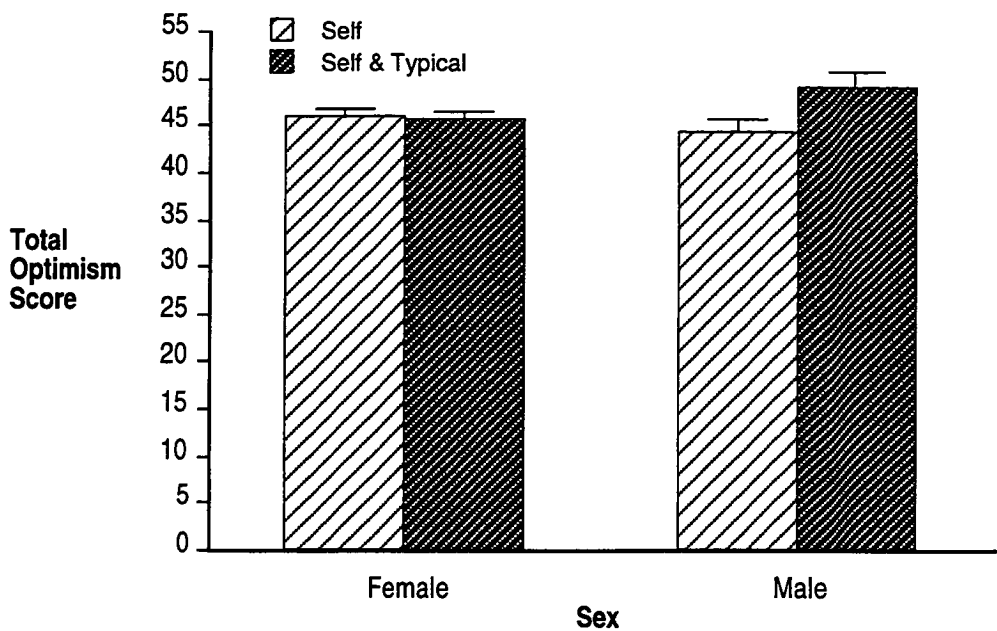


Figure 10.3 Interaction between sex and item target. Vertical lines depict standard errors of the means.

Optimism score on positive health event items

For the age inclusive set, ANOVA showed no significant main effects, but there was a significant interaction between sex and item type, $F(1,208) = 6.98$, $p = .009$. This interaction is shown in Figure 10.4 where it can be seen that most optimism was shown by females on Dobber items and by males on Salovey items. Means comparisons showed significant differences between females on the Dobber and Salovey items ($p = .028$) and between males and females on Dobber items ($p = .040$).

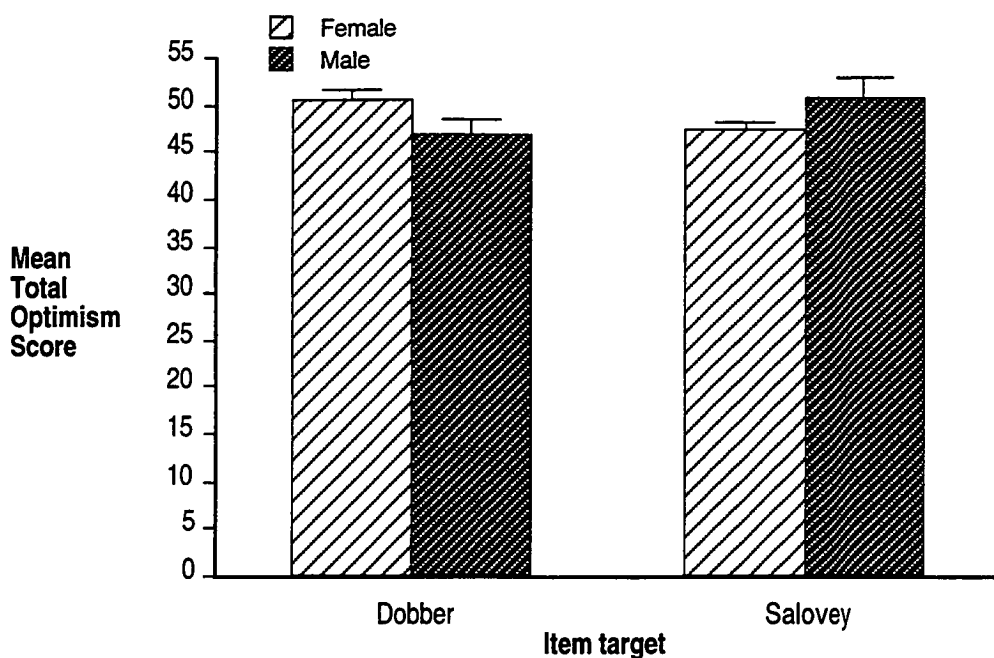


Figure 10.4 Interaction between sex and item type (negative items, self items, all quadrants, age inclusive set). Vertical lines depict standard errors of the means.

For the younger subset, there were no significant main effects, but there were two significant interactions. The first was between sex and item type, $F(1,157) = 4.6$, $p = .033$. Figure 10.5 shows that unlike in the age inclusive set, females were more optimistic on the Dobber items. The only significant difference between pairs of means was between males and females on Dobber items ($p = .017$), with females being more optimistic. The second interaction was between sex and item target, $F(1,157) = 4.56$, $p = .034$, as shown in Figure 10.6, where it can be seen that responding for both the self and the typical student had a substantial effect on males who gave much more pessimistic ratings. Means comparisons showed that significant differences between scores for female self and male typical&self, ($p = .049$), between female typical&self and male typical&self, ($p = .028$) and between male self and male typical&self ($p = .030$).



Figure 10.5 Interaction between sex and item type (positive items, self items, all quadrants, younger subset). Vertical lines depict standard errors of the means.

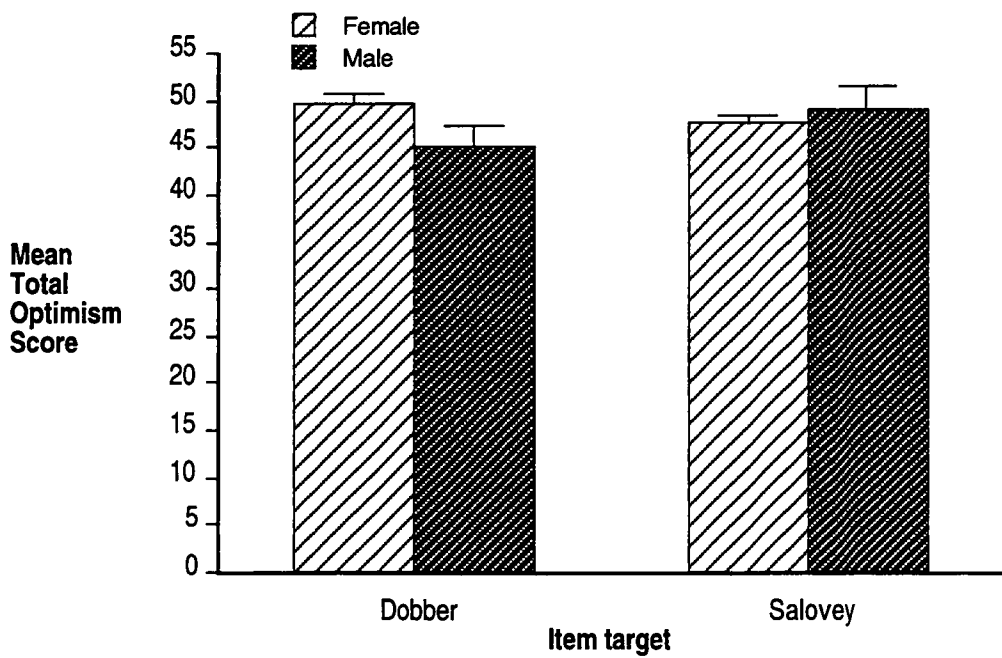


Figure 10.6 Interaction between sex and item target, (positive items, self items, all quadrants, younger subset). Vertical lines depict standard errors of the means.

For Salovey items and shorter Dobber items only

There were two major differences between the Dobber and the Salovey items:

1. Dobber items were much longer than Salovey items
2. Dobber positive and negative items were yoked in their content, whereas Salovey positive and negative items were not yoked.

Total numbers of words in items are shown in Table 10.4.

Table 10.4 Total Numbers of Words in Items.

<i>Dobber items</i>	<i>negative</i>	<i>positive</i>
Cue included, Age included	217	208
Cue excluded, Age included	133	208
Cue included, Age excluded	177	208
Cue excluded, Age excluded	93	208
<i>Salovey items</i>	<i>negative</i>	<i>positive</i>
All	30	38

Further analysis of self data across all quadrants of the design, was undertaken of all Salovey items as well as those Dobber items where both age and cue were excluded (providing Dobber items as similar as possible in length to Salovey items). A 2 (Sex) x 2 (Item type) x 2 (Item target) x 2 (Mood induction) ANOVA was performed. Optimism scores derived from negative items and from positive items as well as the corresponding response times were dependent variables in separate analyses.

Optimism score on negative health event items

For the age inclusive set, there was a significant main effect for item target, $F(1,112) = 7.06$, $p = .009$, with more optimism for self, $M = 47.54$, ($SD = 7.56$), being shown when participants also made a rating for a typical student than when they made a rating just for themselves $M = 44.20$, ($SD = 8.07$). There was also a significant interaction between sex and item type, $F(1,112) = 4.55$, $p = .035$. As can be seen in Figure 10.7, the most optimistic scores were by males on Salovey items and the most pessimistic by males on Dobber items. For the younger subset, there were similar

effects, but in this case the female Dobber - female Salovey contrast reached significance ($p = .019$).

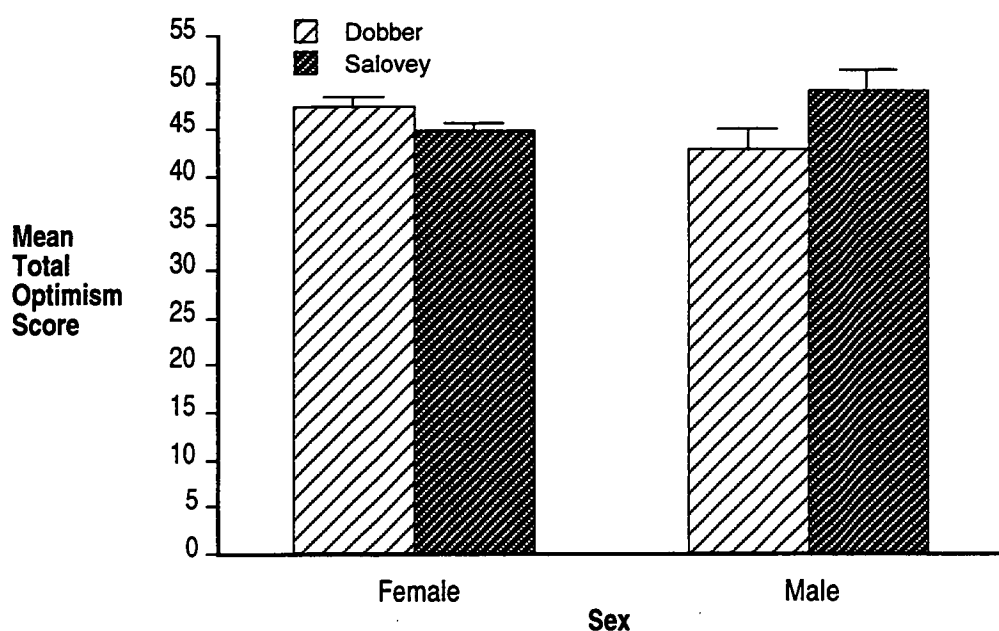


Figure 10.7 Interaction between sex and item type (negative items, self items, all quadrants, shorter items, age inclusive set). Vertical lines depict standard errors of the means.

Optimism score on positive health event items

ANOVA indicated a significant main effect for item target, $F(1,112) = 4.53$, $p = .036$, with greater optimism being shown in scores for self when the participant also made a typical rating, $M = 48.06$, ($SD = 8.96$) than for the self alone, $M = 49.07$, ($SD = 8.35$). There was a significant interaction between sex and item target, $F(1,112) = 4.95$, $p = .028$. As can be seen in Figure 10.8, the males who responded to items for self alone were the most optimistic. All other scores were similar. Means comparisons showed that the only significant differences between pairs of means was between male self compared with male typical&self, $p = .014$. (Variability of the scores probably accounts for the lack of significance between means which appear significant on the graph.) The younger subset analysis also revealed a main effect only for item target, and an interaction between sex and item target.

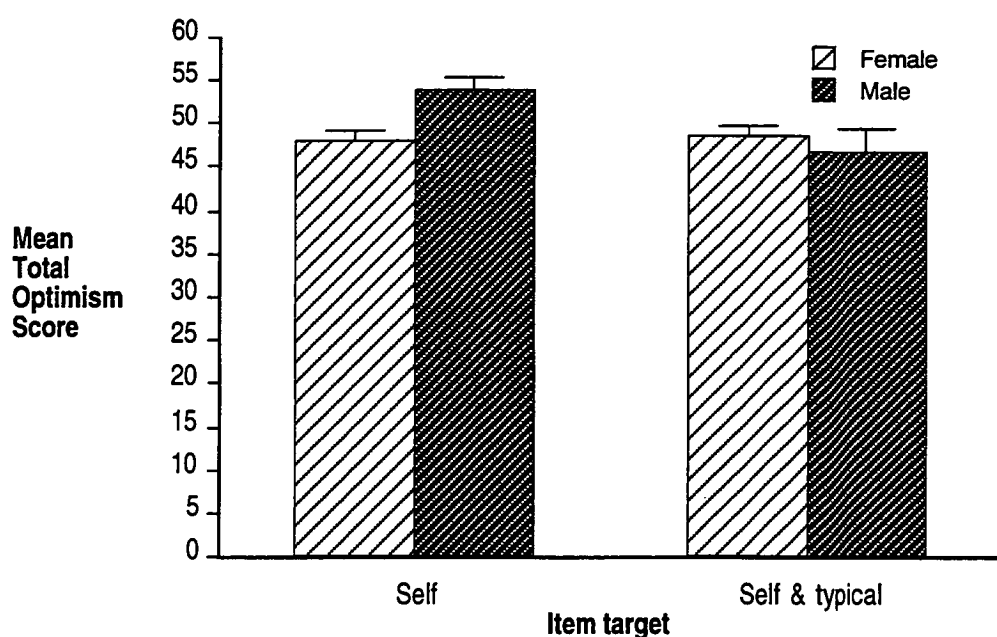


Figure 10.8 Interaction between sex and item target (positive items, self items, all quadrants, short items, age inclusive set). Vertical lines depict standard errors of the means.

Analysis of 'typical&self' data across the two 'typical&self' quadrants.

Data from the Salovey and Dobber quadrants of the design in which participants were asked to make a typical rating, was analysed with 2 (Sex) x 2 (Item type) x 2 (Mood induction) ANOVAs. Optimistic bias scores (rating for self minus rating for the typical student) for negative items and optimistic bias scores for positive items, and the corresponding response times were dependent variables in separate analyses.

Analyses across all items of the two quadrants

Optimistic bias score on negative health event items

ANOVA indicated no significant effects in either the age inclusive set or the younger subset.

Response time for negative health event items

For the age inclusive set, ANOVA indicated a significant main effect for item type, $F(1,104) = 6.11, p = .015$ with the longer Dobber items taking longer, $M = 113.89$,

($SD = 37.30$), than the Salovey items, $M = 94.71$, ($SD = 34.48$). For the younger subset, ANOVA indicated no significant effects.

Optimistic bias scores on positive health event items

ANOVA indicated a significant main effect for item type $F(1,104) = 4.88$, $p = .029$ with Dobber $M = 6.39$, ($SD = 7.00$, and Salovey $M = 8.38$, ($SD = 10.12$. There was a significant interaction between sex and item type $F(1,104) = 5.57$, $p = .020$. As shown in Figure 10.9, the most optimistic scores were obtained for males on Salovey items and the most pessimistic scores by males on Dobber items, with female scores similar for both item types. Means comparisons showed that there were significant differences between males on Dobber items, $M = 3.31$, ($SD = 6.72$), and on Salovey items, $M = 11.82$, ($SD = 12.95$), $p = .009$. For the younger subset there were no significant effects.

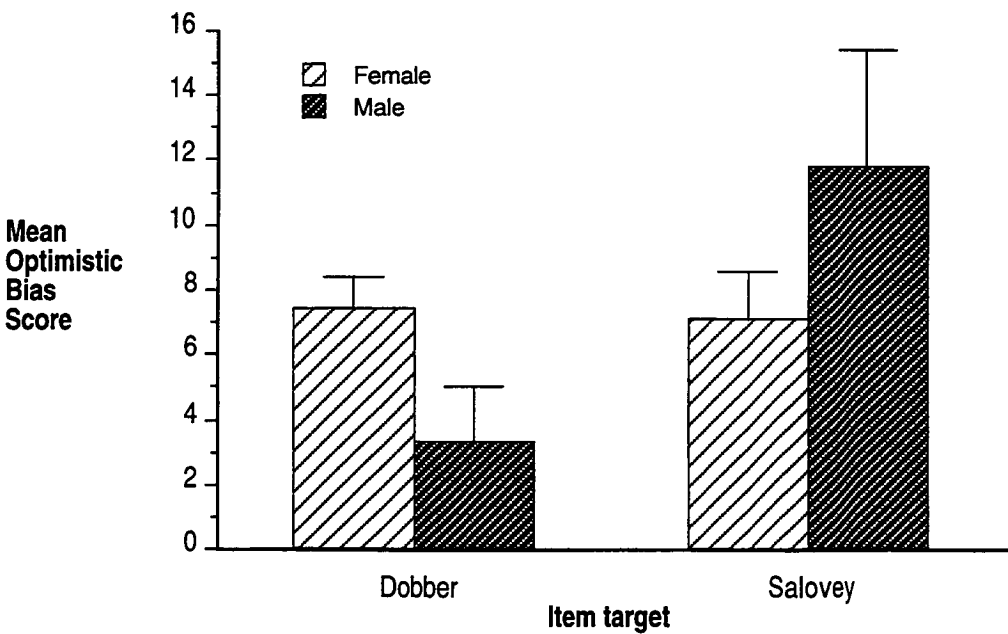


Figure 10.9 Interaction between sex and item type (positive items, two typical&self quadrants, age inclusive set). Vertical lines depict standard errors of the means.

Response time for positive health event items

For the age inclusive set, ANOVA indicated a significant main effect for item type, $F(1,104) = 6.91, p = .001$, with the longer Dobber items $M = 122.44$ secs, ($SD = 43.12$) taking longer than Salovey $M = 103.52$ secs, ($SD = 36.15$). For the younger subset, there was a significant effect for sex, with males, $M = 120.73$ secs, ($SD = 36.10$) taking longer than females, $M = 104.07$ secs, ($SD = 32.49$).

Analysis of 'optimistic bias' data (Salovey items and shorter Dobber items)

Further analysis of typical&self data across both Dobber and Salovey item types, where participants were asked to make a response for the typical student as well as for themselves, was undertaken with the exclusion of the three longest Dobber conditions according to the number of words in the item (as for the self only data above).

Optimistic bias score on negative health event items

ANOVA indicated no significant effects, for either the age inclusive set or the younger subset.

Response time for negative health event items

ANOVA indicated no significant effects for either the age inclusive set or the younger subset.

Optimistic bias scores on positive health event items

For the age inclusive set, ANOVA indicated no significant effects. Neither were there any significant effects for the younger subset.

Response time for positive health event items

For the age inclusive set, ANOVA indicated a significant main effect for item type, $F(1,56) = 6.26, p = .015$, with the longer Dobber items, $M = 126.25$ secs, ($SD = 41.06$) taking longer than those of Salovey, $M = 103.52$ secs, ($SD = 36.15$).

For the younger subset, ANOVA indicated that, as well as a significant main effect for item type, there was also a main effect for sex, $F(1,42) = 10.73, p = .002$ with males, $M = 123.08$ secs ($SD = 40.60$) taking longer than females, $M = 103.46$, ($SD = 31.44$), and an interaction between sex and item type, $F(1,42) = 5.51, p = .024$. The graph of the interaction shown in Figure 10.10 shows that males, $M = 172.33$ secs, ($SD = 38.68$) took longer to answer Dobber items than did females $M = 114.73$ secs, ($SD = 37.04$) with a significant difference between the two ($p = .003$). Males and females had similar response times on Salovey items.

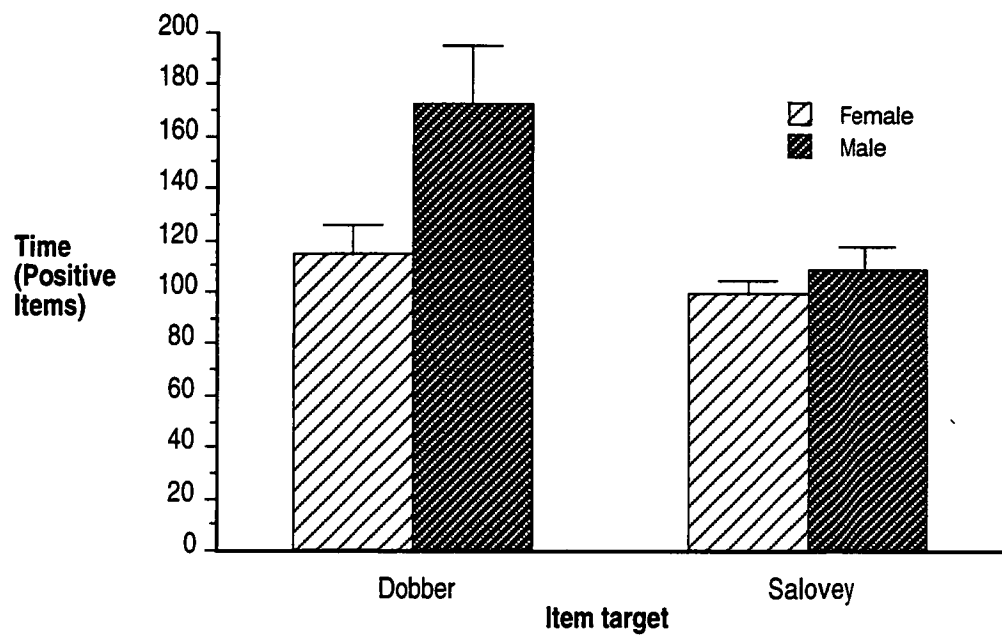


Figure 10.10 Interaction between sex and item type, (positive events, two typical&self quadrants, younger subset). Vertical lines depict standard errors of the means.

As in the previous experiments, post-experimental questionnaires yielded no significant information.

Correlations

Because ambient mood might be more pervasive than induced mood, correlational analyses were run between final mood and optimism ratings (cf. Salovey & Birnbaum,

1989) and between final mood and response time (for both the age inclusive set and the younger subset) as outlined in Table 10.5.

Table 10.5 Schema for Correlations of Final Mood with Optimism Scores and with Response Times.

Optimism ratings for	$\left\{ \begin{array}{l} \text{all quadrants} \\ \text{Salovey; and Dobber (cue excluded, age excluded)} \\ \text{Salovey only}^* \\ \text{all Dobber}^* \\ \text{Dobber (cue excluded, age excluded)}^* \end{array} \right\}$
Optimistic bias scores, (self - typical) for	$\left\{ \begin{array}{l} \text{two relevant quadrants}^* \\ \text{Salovey; and Dobber (cue excl., age excl.)}^* \\ \text{Salovey only}^* \\ \text{all Dobber}^* \\ \text{Dobber (cue excl., age excl.)}^* \end{array} \right\}$

Note. * Response times were also correlated with mood where appropriate, as asterisked.

As the hypotheses (that mood rating will correlate positively with optimism scores or optimistic bias scores and negatively with response time) were directional, the tests of significance were one-tailed. The results are shown in Table 10.6.

Optimistic bias scores – negative health events

For the age inclusive set (and also the younger subset) the significant correlation between mood rating and optimistic bias score (i.e. self minus typical score) for negative health events on the Salovey items replicated the findings of Salovey and Birnbaum (1989, Experiment 3) with healthy participants. This occurred despite the lack of mood maintenance until the end of the experiment for this quadrant. However, as there was no corresponding significant correlation of mood with response time, Forgas’s model was not supported. The only other correlations between mood and optimistic bias score on negative health events were likely to be due to the strong correlation for the Salovey items discussed above.

Table 10.6 Correlations of Final Mood with Optimism Scores/Response Times.

Self data from all four quadrants – Age Inclusive Set								
	df	correlation of final mood with ...						r (crit.)
		Optimism Score			Response Time			
		neg	pos	both	neg	pos	both	
All (Salovey and Dobber)	222	.16*	.18*	.23*	n/a	n/a	n/a	.11
Salovey & Dobber (Cue, Age excl.)	126	.21*	.09	.19*	n/a	n/a	n/a	.14
Salovey only	94	.21*	.18*	.27*	-.01	.09	.04	.18
Dobber only	126	.13	.19*	.22*	.01	.06	.04	.14
Dobber (Cue, Age excl.)	30	.20	-.19	-.02	.21	.01	.12	.30
Self minus typical data for two relevant quadrants – Age Inclusive Set								
	df	correlation of final mood with ...						r (crit.)
		Optimism Score			Response Time			
		neg	pos	both	neg	pos	both	
All (Salovey and Dobber)	110	.27*	.15	.25*	.01	.01	.07	.16
Salovey & Dobber (Cue, Age excl.)	62	.38*	.06	.23*	.06	.08	.09	.21
Salovey only	46	.46*	.17	.35*	.05	.20	.15	.24
Dobber only	62	.08	.11	.12	.02	.06	.05	.21
Dobber (Cue, Age excl.)	14	-.14	-.53*	-.46*	.12	-.37	-.18	.43
Self data from all four quadrants – Younger Subset								
	df	correlation of final mood with ...						r (crit.)
		Optimism Score			Response Time			
		neg	pos	both	neg	pos	both	
All (Salovey and Dobber)	171	.16*	.21*	.26*	n/a	n/a	n/a	.12
Salovey & Dobber (Cue, Age excl.)	99	.20*	.07	.18*	n/a	n/a	n/a	.16
Salovey only	74	.18	.16	.24*	-.02	.06	.02	.19
Dobber only	95	.15	.25*	.27	.06	.06	.07	.17
Dobber (Cue, Age excl.)	23	.33	-.25	.09	.28	.04	.17	.34
Self minus typical data for two relevant quadrants – Younger Subset								
	df	correlation of final mood with ...						r (crit.)
		Optimism Score			Response Time			
		neg	pos	both	neg	pos	both	
All (Salovey and Dobber)	79	.30*	.07	.23*	.03	.01	.08	.18
Salovey & Dobber (Cue, Age excl.)	48	.36*	-.03	.18	.08	.05	.08	.23
Salovey only	34	.46*	.07	.35*	.06	.21	.14	.28
Dobber only	43	.12	.05	.10	.02	.04	.04	.25
Dobber (Cue, Age excl.)	12	-.06	-.38	-.31	.13	-.37	-.17	.26

Note. * Significant at $p = .05$.

Optimistic bias scores – positive health events

The only significant correlation of mood with optimistic bias score for positive health events was an inverse correlation for short Dobber items for the age inclusive set (but not for the younger subset). There were no significant correlations between mood and response time.

Optimism scores – negative health events

Dealing now with optimism scores (i.e. scores from all data relating to the participants themselves) on negative health events in relation to mood, it can be seen that for the age inclusive set there were significant correlations for all but the Dobber (longer and shorter) items. For the younger subset significant correlations were found only for the Salovey and Dobber total groups (with Dobber longer or shorter forms).

Optimism scores – positive health events

There were also some significant correlations for optimism scores on positive health events in relation to mood. These were for all Dobber and Salovey, for Salovey only (age inclusive set only) and for Dobber only (age inclusive set and younger subset). Again there were no significant correlations of mood with response time.

Conclusions – from correlational data

There was some support for Salovey and Birnbaum's (1989, Experiment 3) finding of mood congruence with optimistic bias for negative health events, but this did not generalise to the types of items used in this series of studies. The significant finding for positive items on shorter Dobber items (inverse correlation) is difficult to interpret. There have also been some significant correlations for raw optimism scores. The lack of any significant correlations between mood and response time (even when there were significant correlations with optimistic bias or optimism scores) suggests that mood congruence, when it occurs, is not related to response time and therefore this aspect of the experiment provides no support for Forgas's AIM.

Summary and Conclusions

Overall, mood ratings at the end of the experiment were consistent with highly effective mood inductions. However, mood ratings for happy induction compared with sad induction groups for the Salovey (typical&self) quadrant at the end of the experiment

were not significantly different from each other, perhaps indicating an incompletely effective mood induction, but more likely some decay of induced mood.

Mean age across mood/sex groupings was from $M = 20.92$ to $M = 24.54$ years. Age has seldom been taken into account in studies of mood effects on judgments. In any case the differences between the groups was allowed for by the analyses of data from both the age inclusive set and the younger subset.

The preliminary hypothesis that participants who made ratings for a typical student as well as themselves would make more optimistic health ratings for themselves than for typical students was strongly supported for both negative and positive health events thus confirming Weinstein's (1980) optimistic bias effect.

The results of tests of the major hypotheses (ANOVAs) are summarised in Table 10.7. Correlations have already been summarised in Table 10.6.

Analyses of variance indicated no significant mood effects when judgments were made in relation to negative health events and participants were asked to rate their prospects compared with those of the typical university student. This applied even for items like those of Salovey and Birnbaum (1989) who found a significant effect for mood on optimistic bias score. However, some caution needs to be expressed as this was the quadrant for which mood induction and/or retention was not as successful as for the other quadrants of the experiment. For the (short form) Dobber items (those most comparable to Salovey and Birnbaum items) even though mood was successfully induced/maintained there was still no mood effect on optimistic bias.

Correlations between final mood rating and optimism scores (summarised in Table 10.6), evaluated as by Salovey and Birnbaum (1989), replicated their findings of

Table 10.7 Summary of ANOVA Results Involving Mood from Experiment 8.

<i>Dependent variable</i>	<i>Variables</i>	<i>Age inclusive set</i>		<i>Younger subset</i>	
		<i>N</i>	<i>p</i>	<i>N</i>	<i>p</i>
<i>Analyses of Aspect</i>					
Negative score	Induced mood, Sex, Item type, Aspect	224	.838		
Positive score	as above	224	.510		
Total score	as above	224	.536		
<i>Preliminary analyses</i>					
Age (all participants)	Induced mood, Sex, Item type, Item target	224	.395	173	.484
Final Mood (all participants)	Induced mood	224	.001*	173	.001*
Final Mood (Dobber, self only, quadrant)	Induced mood	64	.012*	52	.020*
Final Mood (Dobber, self & typ. quadrant)	Induced mood	64	.009*	45	.001*
Final Mood (Salovey, self only, quadrant)	Induced mood	48	.001*	40	.001*
Final Mood (Salovey, self & typ. quadrant)	Induced mood	48	.116	36	.467
<i>Analyses of all four quadrants</i>					
Ratings on negative events for 'Self'	Induced mood, Sex, Item type, Item target	224	.891	173	.863
Ratings on positive events for 'Self'	as above	224	.386	173	.083
<i>Analyses of all Salovey and shortest Dobber items</i>					
Ratings on negative events for 'Self'	as above	128	.633	101	.311
Ratings on positive events for 'Self'	as above	128	.925	101	.504
<i>Analyses of two 'typical&self' quadrants</i>					
Optimistic bias scores - negative items	Induced mood, Sex, Item type	112	.857	81	.780
Optimistic bias scores - positive items	as above	112	.485	81	.840
Time (negative items)	as above	112	.657	81	.755
Time (positive items)	as above	112	.768	81	.148
<i>Analyses of Salovey and shortest Dobber items in the two 'typical&self' quadrants</i>					
Optimistic bias scores - negative items	as above	64	.926	50	.832
Optimistic bias scores - positive items	as above	64	.136	50	.136
Time (negative items)	as above	64	.856	50	.995
Time (positive items)	as above	64	.897	50	.077

Note. * Significant at $p = .05$.

Key: Variables: Induced mood (Happy, Sad)
Sex (Male, Female)
Item type (Dobber, Salovey)
Item target (Self, Typical&self)
Aspect ('Self' alone, 'Self' with typical)

significant effects for negative health events, but this did not generalise to items of the type developed for this study. The significant correlations between mood and optimism scores for some negative and positive items suggests that mood congruence was not confined only to relative judgments (that is those resulting in optimistic bias scores).

The lack of any significant correlations of mood with response time, even where optimism/optimistic bias scores were significant, suggests no support for Forgas's (1994a) AIM.

Chapter 11

Summary, Discussion, Implications and Conclusions

Chapter 11

Between the idea

And the reality

.....

Falls the Shadow.

The Hollow Men - T.S. Eliot (1925)

Chapter 11: Summary, Discussion, Implications and Conclusions

This thesis began with a survey of the literature concerning affective influences on cognition, leading to an examination of Forgas's AIM and of mood effects on health judgments. This was followed by reports of experiments investigating the applicability of Forgas's (1992a, 1992c, 1994a, 1995b) AIM to health judgments. Complex stimuli requiring elaborate processing were expected to show mood effects (Forgas, 1994a). According to the AIM, sad moods would influence social judgments more than happy moods, as a result of the extended processing time associated with sad moods. On these bases, the fundamental hypotheses of this thesis were that people in whom a sad mood had been induced would:

- (i) be more pessimistic about both the possibility and outcome of modifying their behaviour and
- (ii) take longer to process health-relevant information, than those in whom a happy mood had been induced.

Chapter 6 reported Experiment 1, which established an effective non-verbal audiovisual method of inducing happy and sad moods, and compared it with a traditional autobiographical method. The non-verbal method was developed for subsequent use in experiments on persuasive messages where a mood induction would ideally be free of any cognitive content relating to test items. (As noted previously, this study was

initially planned to examine mood effects on persuasive messages, but a different direction was taken when mood effects were not established for health judgments.) The autobiographical method, used as a basis for comparison, was also confirmed as effective, and was later used for group administration of experiments.

Chapter 7 reported Experiments 2, 3 and 4. In these experiments participants estimated the likelihood that they would encounter specific problems given their current behaviour, their perceived chances of modifying their current behaviour and the improvement they expected might result from such a change. This yielded three measures of optimism:

- (i) a prediction of future health given the current behaviour,
- (ii) perceived chances of changing the behaviour in a healthy direction – reversed to provide an ‘optimism’ score, *and*
- (iii) predicted change in health given the behavioural modification (derived from the expected improvement minus the likelihood rating given current behaviour).

Experiment 2 used the audiovisual mood induction technique found effective in Experiment 1, to induce happy, sad and neutral moods in male and female participants. Items were presented on computer. Moods were effectively induced, although not maintained until the end of the experiment. Across all three measures of optimism mood showed few significant effects on scores: the only significant effects for mood were for alcohol and ultraviolet exposure – for perceived chance of changing the behaviour (both mood incongruent), and for exercise – for predicted change in health given the behavioural modification (which was mood congruent). There were no significant effects for response time. This applied to earlier ratings, where mood effects could have been most likely, as well as to later ones, and also to the overall rating.

Experiment 3 differed from Experiment 2 in using a more traditional autobiographical mood induction technique which, like the audiovisual technique, had been found to be effective in Experiment 1. Moods were effectively induced, although again not maintained until the end of the experiment. This time there were no significant effects of mood on pessimism/optimism scores or on response time.

Experiment 4 differed from Experiment 2 in using pencil-and-paper to present items (with a control group using computer), in case the computer administration used in Experiments 2 and 3 had diminished the effects of mood inductions. Other differences were that all participants were females and there were only two mood induction groups: happy and sad. The audiovisual mood induction technique was used. Again moods were successfully induced, but overall there were few significant mood effects on pessimism/optimism scores: the only significant effects for mood were for cannabis, ($N = 11$), for perceived chance of changing the behaviour, (but in a mood incongruent direction) and also for predicted change in health given the behavioural modification (in a mood congruent direction). There were no significant effects for response time.

In summary, there was very little evidence that mood influenced pessimism/optimism scores or response times in Experiments 2, 3 or 4, even though moods were monitored and effectively induced and two mood induction methods and two response modes were used. Correlational analyses occasionally showed congruity of moods with judgments but this was inconsistent between the three experiments.

A decision was therefore made that, in subsequent experiments, mood checks would only be made at the conclusion of the experiment to prevent the possibility that awareness of mood might render judgments immune to mood effects (Schwarz & Clore, 1983). A decision was also made to examine and follow the methodology of Salovey and Birnbaum's (1989) Experiment 3 more closely. Before this was attempted,

two other methodological issues were considered and reported in Chapter 8 as Experiments 5 and 6.

Experiment 5 determined that the direction of the ratings scales (*very likely* - *very unlikely*, or *very unlikely* - *very likely*) made no significant difference to optimism scores. It was concluded, therefore, that lack of mood effects was not in any way due to the direction of the scales. Experiment 6 compared depth of processing between the two item types, that is, those developed for this thesis, and those of the type used by Salovey and Birnbaum (1989). A comparison of processing times for these item types, with adjustments for length of items, indicated that the type of item used in this thesis involved as much processing as, and probably more than, that of Salovey and Birnbaum (1989) and therefore was at least as like to incur substantive processing. These experiments also provided an opportunity to calculate correlations between ambient mood and optimism score and between ambient mood and response time. There were no significant correlations of mood with optimism scores or with response time found using data from Experiment 5. Data from Experiment 6, however ($N = 60$), showed significant correlations between ambient mood and optimistic bias scores for negative items, for both Salovey and Dobber items, in accordance with Salovey and Birnbaum's (1989) findings. In addition there were significant correlations between ambient mood and optimistic bias scores for Dobber 'neutral' items. There were also some significant correlations for Dobber items of positive and negative valence for analyses with "Self" ratings.

Chapter 9 reported Experiment 7, which combined administration of suitably adapted items from Salovey and Birnbaum's (1989) Experiment 3, with items of the type developed for this thesis. Experiment 7 was run using groups of people in whom sad or happy moods were effectively induced using the autobiographical method. Firstly, Weinstein's (1980) optimistic bias hypothesis was confirmed by this experiment: participants making judgments for the "average student" and for themselves made more

optimistic judgments concerning themselves. Secondly, the results provided support for Salovey and Birnbaum's (1989) findings of mood congruence for people in a sad mood making judgments about negative health events. However, this was demonstrated only in the case of responses for "Self only", for the subset of participants aged under 25 years, when Dobber and Salovey items were analysed together. There were also indications that the items typical of this series of studies were responded to differently from those of Salovey and Birnbaum (1989, Experiment 3): participants in whom a sad mood had been induced responded more optimistically to the Dobber items than to those of the Salovey and Birnbaum type. There were no significant effects for response time. Correlational analyses of ambient mood with optimistic bias scores, and with response time, confirmed corresponding correlational findings of Salovey and Birnbaum (1989) of mood congruence for negative health events. Mood congruence was also demonstrated with "Self only" optimism scores. There was evidence for mood congruence with positive events for "Self", but only for the subset of participants aged under 25 years. There was a trend for response times to correlate negatively with mood (as required by Forgas's AIM) when participants responded to items for both the typical student and for themselves, for the age inclusive set of participants. However, as Ellis and Ashbrook (1988) indicated, if mood is not manipulated then no causal inferences can be made.

Chapter 10 reported the results of Experiment 8 which, like Experiment 7, was run in groups. Experiment 8 involved the breaking down of the items designed for use in this series of studies. The items used were originally of the form: *Given your current exposure to sunlight, what do you think would be your chances of contracting skin cancer, by the age of 70?* For Experiment 8 such an item was broken down into four sub-types to establish under what circumstances mood infused judgments. In this experiment, items were grouped so that judgment times could be assessed separately for negative and positive items. This enabled the testing of a fundamental tenet of the

AIM, that judgments take longer when a person is in a sad mood thus allowing greater affect infusion, for negative and positive health items separately.

Moods at the end of the experiment were rated in the direction of sad and happy poles for sad and happy mood induction groups respectively, although they were not retained as well in the Salovey: typical&self quadrant as in the other three. Analyses of variance indicated no significant effects of induced mood on optimism/optimistic bias scores or response times for negative or positive health events. Nevertheless, correlational analyses again replicated Salovey and Birnbaum's findings of mood congruent judgments for negative health events. Additionally, there were some significant correlations for optimism scores for the "Self" for negative and positive items suggesting that mood congruence might not be confined to relative judgments (those resulting in optimistic bias scores). There was no support for Forgas's model, even when ambient mood, rather than induced mood, was examined in relation to optimism scores and response times. Where mood correlated significantly with optimism or optimistic bias scores, there was no association with significant correlations of mood with response time. It seems unlikely, therefore, that Forgas's AIM extends to health judgments made by healthy people.

Discussion

In summary, the results of the experiments reported in this thesis:

- (i) uphold Weinstein's (1980) optimistic bias principle: when the student participants made judgments for themselves and for the "average student" they made more optimistic judgments concerning themselves,
- (ii) provide some support for Salovey and Birnbaum's (1989) finding of mood effects for judgments about negative health events,
- (iii) suggest that mood effects do not generalise to include the particular kind of health items developed for this study,

- (iv) suggest that mood effects do not generalise to include items from the present study which were modified to be more similar to those of Salovey and Birnbaum (1989), *and*
- (v) indicate that Forgas's AIM does not apply generally to health judgments.

Experimental issues

That consistent mood effects were not found gives rise to the following questions and responses regarding the experiments.

- (i) Were moods effectively induced and maintained? Mood inductions were invariably found to be effective in Experiments 2, 3 and 4 in which post-induction mood ratings were obtained. Although mood was not maintained even analysis of earlier items failed to show affect infusion.
- (ii) Did participants know mood had been manipulated with the possible consequence of mood awareness or compliance effects? In Experiments 2, 3, 4, 7, and 8, the mood induction was introduced as one experiment and the judgments as another. No participant in any of the experiments expressed any suspicion about a connection between the supposedly separate studies in the post-experimental questionnaires. In any case, in later experiments (7 and 8), mood ratings were made subsequent to health judgments, yet there was still no evidence of affect infusion.
- (iii) Were Forgas's (1994a) principles governing processing choices met as appropriately in the present experiments as in Salovey and Birnbaum's (1989) Experiment 3? One of Forgas's principles for substantive processing was target atypicality. This condition could be considered to be as well met for Dobber as for Salovey and Birnbaum (1989) items: both involved health judgments involving potentially serious health outcomes. Forgas's second

principle for substantive processing was that the person making the judgments has no specific motivational goal and has adequate cognitive capacity. Again this condition could be expected to apply equally to the present experiment and to Salovey and Birnbaum's (1989) Experiment 3: university students participated as part of a course requirement in similarly conducted studies. Forgas's third principle was that of the situation: accuracy could reasonably be expected in a group of university students, in the Dobber as in the Salovey and Birnbaum (1989) studies.

- (iv) Was the processing required by the items sufficient to result in affect infusion? Experiment 6 indicated that the items used in the present experiments involved processing at least as detailed as that required by Salovey and Birnbaum's (1989) items. In any case the AIM was not upheld in the present studies even for items of the type used by Salovey and Birnbaum (1989).
- (v) What of the sex ratio in Salovey and Birnbaum's Experiment 3 compared with those in the experiments of this thesis? Salovey and Birnbaum's Experiment 3 involved 33 healthy undergraduates, 21 males and 12 females. In the present experiments there were usually three times as many females as males. Although Salovey and Birnbaum (1989, Experiment 3) found no significant effects for sex, Fujita, Diener and Sandvik (1991) found gender differences for negative affect, with females experiencing greater emotional intensity, positive and negative, and showing more negative affect. Females and males, however, reported equal happiness. Although the present study employed a higher proportion of females than Salovey and Birnbaum (1989), the greater emotional intensity of female participants reported by Fujita, Diener and Sandvik (1991) would have been expected to enhance affect infusion rather than diminish it.

The bases for the experimental work reported in this thesis were (i) that Salovey and Birnbaum (1989, Experiment 3) found that affect influenced perceptions of symptoms, health efficacy and expectations of future disease, *and* (ii) this provided evidence that 'more complex stimuli that require more elaborate processing may show even greater mood effects' than those found in interpersonal issues (Forgas, 1994a, p. 14). Given these and the adequacy of experimental work as outlined above, the present experiments could have been expected to show affect infusion, but there was little evidence of mood congruence. In any case the lack of an association between mood and response time even when mood congruence was found for Salovey and Birnbaum (1989) items makes interpretation of their findings in terms of the AIM problematic. Theoretical issues will now be considered.

Theoretical issues

Several theoretical issues are raised by the lack of consistent mood effects. These involve mood and optimism as constructs, emotional arousal and emotional valence, self relevance and self concept, mood maintenance and repair, and unrealistic optimism in relation to sad mood.

Mood as a construct

Do happy and sad moods lie along the same axis?

A basic supposition of these and similar studies has been that happy and sad moods are points on a single linear continuum. Teasdale and Barnard (1993, p. 151) indicated that the ICS model regards happy and unhappy induced moods 'not simply as crude sources of bipolar information (good versus bad), but as markers of the processing of mood-related schematic models'. Without entering into this level of complexity, Fiedler (1990) proposed that happiness and sadness might be independent rather than lying at opposite ends of a bipolar axis. This possibility was not taken into account in the mood induction ratings in the present studies, but in any case Forgas has often reported mood effects when mood ratings were assessed on the basis of a bipolar axis, so lack of mood

effects in these studies is not, per se, accounted for by a lack of correspondence between the sad-happy scale used and the cognitive construct it was intended to represent.

How distinct are the moods?

It is possible for music at least, to elicit more than one emotion simultaneously, and these emotions can be contradictory (Salmon, 1993). It would seem, therefore, that several moods might be maintained concurrently, resulting in confounding of mood. Hence, although sad and happy moods were induced in the present experiments, there is no guarantee that they were the only moods induced. Nevertheless, the autobiographical mood inductions used in three of the five relevant experiments in the present series were similar to those used by Salovey and Birnbaum (1989) so a confounding effect of concurrent moods is unlikely to explain the lack of predicted mood effects in the present experiments.

What is neutral mood?

A neutral mood could be expected to be qualitatively different from a happy or sad mood, rather than merely a midpoint between them. This is supported by the work of Salovey (1992) who studied mood-induced self-focused attention and found, that pleasant or unpleasant, but not neutral, mood states induced self-focused attention following the Yerkes-Dodson principle (Yerkes & Dodson, 1908). Because of these considerations, although neutral mood was induced to provide control groups in earlier experiments of this series, this was not continued in later experiments.

Ambient mood compared with induced mood

The term 'ambient' has been used in this series of studies to describe a person's mood at any one time. Sometimes this has been the result of their own initial ('natural') mood combined with the residual effects of an induced mood. The term 'ambient' was chosen to distinguish it from 'natural' mood. In Experiments 5 and 6 however, there were no

mood inductions and 'ambient' mood might equally well have been described as 'natural' mood. Other researchers have investigated natural/ambient moods. Hasher, Rose, Zacks, Sanft and Doren (1985) found that ambient mood in university students was not usually associated with cognitive effects. Kwiatkowski and Parkinson (1994) concluded that naturally depressed mood seemed to be different from induced depressed mood, after demonstrating differences in recall patterns of naturally depressed and induced depressed participants. Mayer, McCormick and Strong (1995), however, found evidence for mood congruent memory with natural, as distinct from induced, mood. They found correlations between pleasant-unpleasant memory retrieval and mood across two independent tasks in all three of their studies. Such findings raise doubts about a unitary interpretation of words like *sad* and *happy* in terms of ambient and induced moods.

Do optimism and pessimism lie along the same axis?

In parallel to the question of the bipolarity of happy and sad mood is that of the bipolarity of optimism and pessimism. Chang and Bridewell (1998) investigated the effects of irrational beliefs on symptoms of anxiety and depression in a university student sample. They found that irrational beliefs had a significant impact on pessimism but not on optimism. This provided support for the view of Chang, D'Zurilla, and Maydeu-Olivares (1994) that optimism and pessimism might be appropriately viewed as partially independent constructs. This might in some way account for the lack of consistent mood effects.

Emotional arousal and emotional valence

A different issue to be considered is the role of emotional arousal in affect infusion. Revelle and Loftus (1990) indicated that individual differences in arousal had implications for the study of mood and memory. They discussed inconsistency in findings of mood-related effects on cognitive processes in terms of effects of arousal, pointing out that mood manipulations influence arousal as well as affective valence.

Motivation and performance literature shows that variations in arousal interact with retention interval to affect immediate and delayed recall. Arousal might hinder aspects of short term memory, but facilitate processing and storage for long term retrieval. As they indicated, arousal is nearly always uncontrolled in mood/memory experiments.

Evidence from a cognitive psychological perspective came from Stormark and Hugdahl (1993), who proposed that when information activated in associative memory involves strong emotional associations, the ability to shift attention away from an emotional cue is impaired. That is, motivational information influences attentional processes. Using behavioural and event related potential data, they demonstrated the selective processing of emotional stimuli indicating that such stimuli elicited sustained attention.

Paulhus and Lim (1994), whose work dealt with interpersonal issues, emphasised emotional arousal rather than emotional valence (sad/happy) and used a 'cognitive complexity' model to explain effects of emotional arousal on retrieval of social information. They found, in both real life and laboratory situations, that emotional arousal reduced the cognitive complexity of social perception. This resulted in polarised evaluations of social targets. Whereas Forgas (1991c) argued that retrieval effects are minimal and that emotion has its effects primarily at encoding (Forgas & Moylan, 1991) the dynamic complexity model endorsed by Paulhus and Lim (1994) addressed the effects of emotion on retrieval of already consolidated memories. They discussed an alternative model whereby high arousal invokes substantive processing, and low arousal, heuristic processing.

In Experiment 1, where mood induction techniques were developed and validated, participants were encouraged to relax before the induction. Likewise, in studies of effects of induced mood on judgments, consideration could also be given to encouraging relaxation before mood inductions and again before the making of judgments. However, the mood induction itself, particularly sad autobiographical

inductions, might well trigger arousal. Unfortunately, relaxation after mood induction might well provide not only an opportunity, but even a motivation, for mood repair, thus weakening induced mood. This points to significant difficulties in designing experiments to control for arousal.

Self relevance and concept of self

Closely related to the issue of arousal is that of relevance of an issue to the self and the person's self concept. It is possible that health issues, because they lie close to the concept of self, might incur a strong motivation towards mood maintenance and repair. Mayer and Salovey (1988) indicated that although network models describe automatic processes occurring without conscious awareness, people also actively intervene in their moods. They found that self relevance of mood and of information can lead to powerful changes in cognition: as mood or the object of thought becomes more self relevant, effects become more powerful. Other workers such as Rogers, Kuiper and Kirker (1977) have proposed that the self might have a superordinate schema of personal information. Higgins and Bargh (1987), while claiming nothing 'special' about the self, indicated that people might not be motivated merely to be accurate or correct, but were likely to have multiple and conflicting motivations when processing self-relevant information. Although self-reference can result in mood congruence, relatedness to the self is not sufficient in itself for mood-congruence. Within their ICS framework, Teasdale and Barnard (1993) proposed that self related material which bypasses the Implicational subsystem (associated with 'hot' cognitions, Zajonc, 1980) does not result in mood congruence.

The degree of self-complexity has affective consequences (Linville, 1987) with complexity buffering the self-concept against adverse events, stress and depression. Smith and Petty (1995) saw self-esteem as an element of the self-concept and found it to be a factor in mood effects. They found that with a negative emotional state, participants low in self esteem exhibited mood congruent recall, whereas participants

high in self esteem did not, presumably because of mood regulation. Mood congruent recall was exhibited for participants of both low and high self esteem when a neutral mood was induced. It seems then that there is a strong link between self esteem and the regulation of negative emotional states. However, the situation is likely to be even more complex: Experiments 2, 3 and 4 of the present studies, found statistically significant correlations between self-esteem and various mood measures.

Laird's (1991) theoretical perspective tied the self closely to emotional experience. He concluded that research on mood-memory and on processes generating emotional experience indicated that mood affects memory because feelings *are* cognitions about the self. According to Laird (1991) knowledge of the outside world could be described as cognition, and knowledge of self (self perception) as affect. The same processes which generate emotional feelings also generate other feeling states: hunger, fatigue, boredom, self-esteem, like/dislike, all of which form a substratum for attitudes. He drew support for his view point from studies which show that people recall self-relevant material consistent with their self-concept better than inconsistent material (Markus & Wurf, 1987; Ross & Conway, 1986).

As noted above, one possibility for the lack of consistent fit of Forgas's model to health judgments is that health judgments may lie too close to the self-concept. Ellis and Ashbrook (1988) proposed that personal memories might be so well integrated that they are relatively impervious to mood effects. However, Riskind (1989) suggested that Ellis and Ashbrook neglected the studies showing that personal memories are usually influenced by mood inductions and therefore were not inert to mood effects. Riskind nevertheless proposed that specific categories of personal memories might be impervious to mood and thought that cognitive priming, rather than mood, might account for mood congruent memory results. Sedikides (1995) advanced a differential sensitivity hypothesis as a result of his findings that central self-conceptions (at least in terms of traits like friendly, modest) were unaffected by mood whereas peripheral self-

conceptions were mood congruent. He drew on the work of Forgas (1995a) as an explanation: peripheral self-conceptions were less elaborated and held with lower certainty, thereby increasing the likelihood of constructive, affect-infusing processes. Hence central self relevant information would recruit direct access or motivated processing, whereas peripheral self relevant information would recruit substantive or heuristic processing. Health issues might reasonably be expected to belong to a category of central relevant information, and, on the basis of Sedikides (1995) would not show affect infusion. However, given that the participants in these experiments were mostly young people this issue is not clear-cut.

Mood maintenance and repair

The issue of mood maintenance and repair deserves further consideration. Like cognitive processes generally, mood regulation processes in particular could perhaps be categorised as automatic or controlled. Mayer and Volanth (1985) noted cognitive involvement in the mood response system, reporting a divergence between self-reported mood and affect-linked cognition. As noted in Chapter 2, a definition of mood is far from being settled. Nevertheless, in daily life, mood feelings are accompanied by cognitions about these moods. Mayer and Gaschke (1988) proposed that mood comprises both the direct experience of mood and also thoughts and feelings about the mood. Mayer, Salovey, Gomberg-Kaufman and Blainey (1991) argued for a broader conception of mood experience indicating that mood comprises both emotional states and mood management. Mayer and Salovey (1993), Mayer, Salovey, Gomberg-Kaufman and Blainey (1991), and Salovey and Mayer (1990) conceptualised such a mood management process as an emotional intelligence which enables people to monitor their own and other's emotions. Such concerns are addressed by Barnard and Teasdale's (1991) ICS model with its Implicational as well as Propositional levels of integration of emotional and cognitive information. This model provides a possible mechanism for such awareness and management of emotion described by emotional intelligence and a plausible account of mood maintenance and repair.

It is possible that such a motivation towards mood maintenance and repair sometimes influences the processing of health issues, resulting in a switch from substantive to motivated processing. This is consistent with Sedikides (1994) who found congruence followed by incongruence in self descriptions of participants induced with sad moods. He interpreted this as a mood 'shock' effect followed by mood regulation. He concluded that such resorting to mood regulation might result in mood effects being less general than previously assumed.

Does unrealistic optimism over-ride sad mood?

A theoretical construct overlapping that of mood regulation is that of optimistic bias. It is possible that unrealistic optimism over-rides sad mood. Gilbert and Wilson (1998, p. 12) proposed that "when circumstances threaten our well-being, we execute an assortment of cognitive strategies designed to prevent, limit, or repair the damage" with our happiness possibly "defended by an invisible shield". Perhaps an optimistic approach to life is so important for some experimental participants that it over-rides experimental mood manipulation.

Abele and Hermer (1993) found self-appraisal, both of health, and of future health risk, more negative with negative mood but not more positive with positive mood. They also found that positive mood led to higher noxiousness ratings of unhealthy behaviours than did negative mood. Abele and Hermer found unrealistic optimism raised to an even higher level by positive than by negative mood, where they found unrealistic pessimism. In this case, unrealistic optimism was seen as being based on probability judgments on possible future events, whereas self-appraisal of health and health risk was based on perception and memory of symptoms underpinned by a stronger personal data base. They proposed that the hypothetical nature of the task might have prevented a stronger influence of negative mood and simultaneously facilitated an optimistic bias. They argued for mood maintenance with positive mood but not with negative mood.

Rodin and Salovey (1989) indicated that, perhaps as a result of attributional processes, people underestimate their own risk (relative to other people's) for illnesses and other negative life events (Kirscht, Haefner, Kegeles, Rosenstock, 1966; Weinstein, 1980). Such unrealistic optimism can have important health consequences because perceived susceptibility is associated with preventive behaviours (Weinstein, 1983). People who have not experienced major negative life events see themselves as particularly invulnerable (Rodin and Salovey, 1989). This is likely to include young people and thus provides another possible explanation for lack of mood effects in the present studies. Rather than involving the self too strongly, perhaps the items of the present studies did not involve the, mostly young, participants enough. Weinstein (1980) had reported unrealistic optimism about future life events – both positive and negative – which he thought might be due to cognitive errors and also to motivational factors and had suggested that such errors might be less prevalent among older people.

Schwarzer (1994) reviewed optimism, vulnerability, and self-belief as health related cognitions and distinguished between defensive optimism (based on situation-outcome expectancies) and functional optimism (based on action-outcome expectancies and self-efficacy expectancies). In terms of health behaviour change, optimistic self-beliefs were thought to be most beneficial because of their operative power in helping a person to set goals, initiate actions and maintain motivation. Unrealistic optimism could undermine preventive action, but optimism about coping might facilitate preventive behaviour. Optimistic bias was seen as only one factor among others. For example, people take preventive measures against disease (e.g. heart disease) even without having seen someone suffering from it. Personality was also seen to influence optimistic bias. Although people usually strive for accuracy unless under some stress, hypothetical events with self-relevance and high ambiguity are commonly regarded as stressful. The possibility of illness or impairment in the future is threatening and therefore provokes self-protective distortions in cognition.

However, as an example of personality/mood influences, Schwarzer (1994) indicated that depressives often make more realistic judgments than do non-depressives (Alloy & Abramson, 1988) and that therefore with ambiguous health threats, it could be assumed that depressives would be less likely to show defensive optimism than non-depressives. Taylor and Brown (1994) found that positive illusions promote psychological well-being. Their reading of the clinical literature indicated that criteria for mental health were contentment, a positive attitude towards the self, ability to care for and about others, openness to new people and ideas, ability to perform creative and productive work, and the ability to grow, develop and self-actualise, especially in response to stressful events. Most people are positively biased in their self perception. Optimism, even if unrealistic, makes people feel better, is associated with positive social relationships and with an ability to cope more successfully and to recover more quickly from health related stressors.

Forgas's AIM as a theory extending to health judgments

Three general criteria outlined by Smith (1978) for assessing a theory were those of generality, extendability, and sufficiency. (In Smith's (1978) case the criteria were used in the context of assessing theories of semantic memory. These criteria were adopted by Wyer and Srull (1989) to assess their model of social information processing.) Generality was considered important with regard to specific findings and to the representations and processes accounting for such findings. Extendability was taken to mean the degree to which the formulations were capable of being extended to more complex situations. Sufficiency was taken to mean the extent to which the theory accounted for all available data. To assess Forgas's AIM, overall, according to these criteria, is beyond the scope of this thesis, however, in the light of this study of mood effects on health judgments some comments can be made.

The findings of the present refinement of Salovey and Birnbaum's (1989) Experiment 3 are not accounted for by substantive processing under the AIM because mood effects

were only occasionally correlated with optimism scores, and not associated with response time, as required by the model. That is the processes described in the AIM, whereby longer processing time allows for more influence of sad mood, were not confirmed and therefore the generality condition is not supported for health judgments. Nor does the AIM necessarily extend to health judgments. It is arguable that health judgments, rather than being more complex, are different in some relevant way from those to which the AIM applies. Although the AIM may be extendable to more complex interpersonal judgments, it does not necessarily apply to intrapersonal judgments. The predictions of the AIM for substantive processing do not apply to the data from the present experiments on health judgments unless the findings can be interpreted in some other way, for example in terms of motivated processing. The theory therefore might or might not meet the sufficiency criterion in relation to health judgments.

In summary, the AIM satisfies neither of the criteria of generality or extendability in relation to health judgments. Hence, it is likely that, although there is considerable evidence for the AIM's applicability to interpersonal judgments, it does not apply, universally at least, to the intrapersonal.

Possible explanations of lack of applicability of the AIM to some judgments

Given that two decades of research on affective influence on cognition has yielded findings whose consistency lies mainly in their inconsistency the area must be considered problematic (cf. Eich & Macaulay, 1998). Forgas's AIM, while providing a neat conceptual framework for mood effects on social judgments, still lacks predictive strength. It could be argued that the present findings are consistent with motivational processing quadrant of the AIM, but such a post hoc explanation challenges the predictiveness of the AIM. Health judgments could be just one type of intrapersonal judgment where mood repair leads to varying degrees of motivated processing in different people and hence to lack of mood congruence. Even for interpersonal

judgments, the AIM sometimes fails to be predictive. Berkowitz, Jaffee, Jo and Troccoli (1998) reported their failure to confirm Forgas's (1995a) mood congruent findings in evaluation of atypical couples, which they attributed to an overcorrection (of a feeling-induced bias) effect in their judgments. Berkowitz et al. (1998, p. 1) even proposed 'a contrast-like effect in which the judgment shifts away from the mood's hedonic nature'. Martin (1998) suggested that human beings operate as gestaltists with motivation apparently playing a more important role than the AIM would suggest. Further, Showers (1998) proposed the compartmentalisation of positive and negative beliefs as an easy and efficient strategy to minimise negative knowledge. When compartmentalisation breaks down, an evaluative integration is required, to accommodate negative knowledge. Compartmentalised and integrative styles of thinking might, she suggested, be important in self regulation. Motivated processing as a quadrant of Forgas's model could be well expanded to include not only mood maintenance and repair, but also the over-correction effect, and compartmentalisation. Such 'quarantining' of mood is very likely to be subject to inter-individual differences, which is likely to make predictions of mood effects on some judgments a difficult task.

Implications

The results of the experiments reported here indicate that information processing in relation to health is not necessarily subject to affect infusion. Also, health judgments might sometimes be more likely to be influenced by a person's ambient mood, particularly if sad, than by any induced mood. It appears likely that depressed people might find it more difficult to undertake health related behavioural change and this might apply also to other behaviours (cf. research findings of Seligman, 1990). Further research on the role of mood in relation to health judgments is required to confirm this. More broadly based research examining mood effects on intrapersonal judgments is also indicated.

Conclusions

The present findings indicate that mood congruity effects in relation to health judgments are unlikely to be accounted for by affect infusion under substantive processing as described by the AIM. This suggests limitations in the predictive capacity of the AIM. Issues to be further understood in relation to mood effects on health judgments include: arousal, self relevance, mood and optimism as constructs, the relationship between ambient and induced moods, and particularly the effects of unrealistic optimism and of motivation (cf. optimistic bias). The provision of an adequate explanatory model, particularly one including intrapersonal judgments, lies ahead. The ICS model (Barnard & Teasdale, 1991; Teasdale, 1993; Teasdale & Barnard, 1993) was developed to overcome inadequacies of Bower's (1981, 1991) network model. An examination of Forgas's AIM in relation to the ICS model is suggested as an area for further research.

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Appendices

Appendix A

Protocols for Experiment 1

- Appendix A1: Experimental Design
- Appendix A2: Participant Consent Form
- Appendix A3: Participant Instructions
- Appendix A4.1: Need for Cognition Scale (Social Cognition Questionnaire)
- Appendix A4.2: Need for Cognition Scale - Showing Reversed Items
- Appendix A5: Typical Visual Analogue Scale
- Appendix A6: Instructions for the Three *Autobiographical* Mood Inductions

Appendix A1: Experimental Design for Experiment 1

<i>Induction Method</i>	<i>Order of Induction</i>		
	<i>First</i>	<i>Second</i>	<i>Third</i>
<i>Audio only</i>	Happy	Sad	Neutral
	Happy	Neutral	Sad
	Sad	Happy	Neutral
	Neutral	Happy	Sad
	Sad	Neutral	Happy
	Neutral	Sad	Happy
<i>Audio visual</i>	Happy	Sad	Neutral
	Happy	Neutral	Sad
	Sad	Happy	Neutral
	Neutral	Happy	Sad
	Sad	Neutral	Happy
	Neutral	Sad	Happy
<i>Visual only</i>	Happy	Sad	Neutral
	Happy	Neutral	Sad
	Sad	Happy	Neutral
	Neutral	Happy	Sad
	Sad	Neutral	Happy
	Neutral	Sad	Happy
<i>Autobiographical</i>	Happy	Sad	Neutral
	Happy	Neutral	Sad
	Sad	Happy	Neutral
	Neutral	Happy	Sad
	Sad	Neutral	Happy
	Neutral	Sad	Happy

(Two subjects were randomly allocated to each of the 24 conditions.)

Appendix A2: Participant Consent Form for Experiment 1

Social Cognition Laboratory

Participant Consent Form

Information for participants in social judgment studies

The research in which you are participating is concerned with factors affecting social judgments, that is judgments which involve people or social issues.

If you agree to participate, please sign and date this form after carefully reading the following section:

I consent to taking part in a psychological experiment on social judgment. I understand that this will involve answering a short questionnaire on my thinking patterns. I will then be asked to relax before attending to some audio/visual presentations and answering some brief questions. I also understand that I may withdraw from the experiment at any time without prejudice.

I have read the information above and any questions I have asked have been answered to my satisfaction.

I agree that research data gathered for the study may be published provided that I cannot be identified as a subject.

Signature of subject Date

Telephone number

Name:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

Signature of investigator Date

Appendix A3: Participant Instructions for Experiment 1

Participant instructions

Explain to participant before induction the appropriate variant of:

‘I am doing research for PhD in Clinical Psychology. The experiment you are involved in is a pilot study for an experiment on attitude change. One of the factors which has been found to influence attitude change is the amount of attention which people are able to pay to a task. This is in turn affected by the things like how relaxed the person is and so on. So during the experiment I am doing with you now, we will be doing a bit of introductory relaxation and at various times you will be asked you various questions which relate to your attention level and so on. The study will involve:

‘**Audio only:** presentation of various pieces of music to which I would like you to listen carefully.

OR

‘**Audiovisual:** presentation of some video tracks, to which I would like you to attend carefully.

OR

‘**Visual only:** presentation of some video pictures, to which I would like you to attend carefully.

OR

‘**Autobiographical:** writing about some incidents, to which I would like you give careful attention.

‘Now we will do some relaxation.

‘One of the ways people can relax is by breathing a little more deeply:

Place one hand on your abdomen and breathe in deeply through your nose into your abdomen to push up your hand as much as feels comfortable. Your chest should move just a little. Just keep breathing slowly and gently for a few minutes.

‘OK

‘Another way to relax is to create tension in a group of muscles and then to relax that muscle group. I would like you to clench both fists for seven seconds. Now let go and as you do this notice the sensation of letting go. Now clench your fists again and then let go. Feel the relaxation.

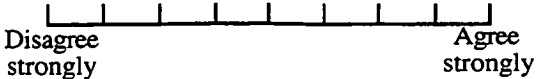
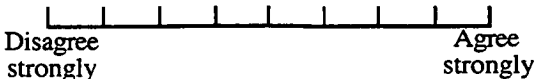
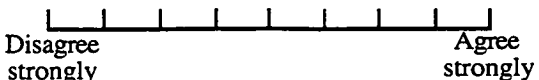
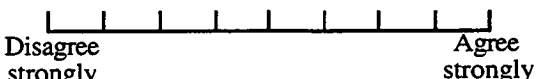
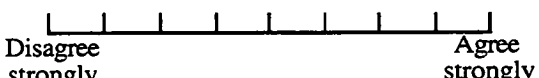
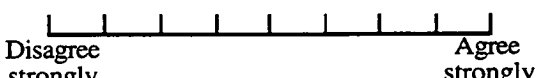
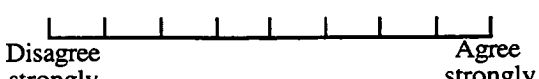
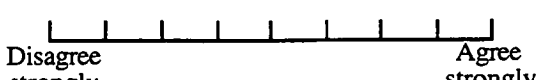
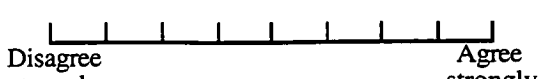
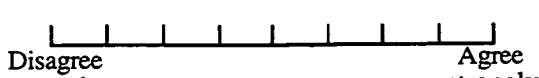
‘Now breathe slowly and allow your whole body to let go. Just relax.’

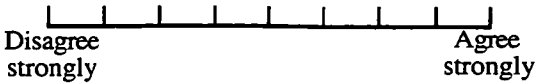
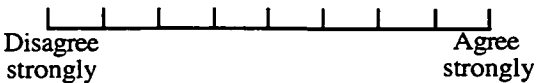
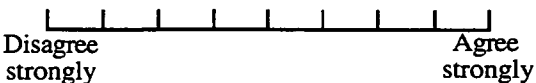
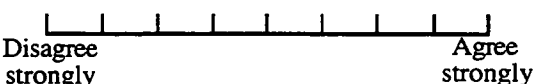
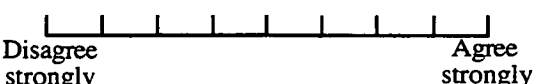
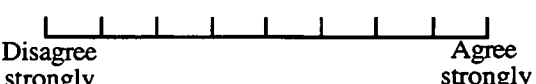
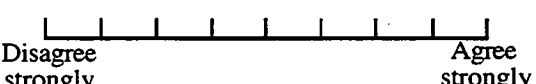
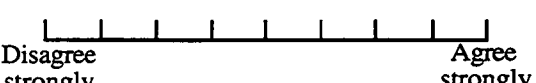
Appendix A4.1: Need for Cognition (Social Cognition) Questionnaire

Subject No:

Social Cognition Questionnaire

Please indicate your degree of agreement or disagreement with the following statements by placing a cross at the appropriate number on the number line.

1. I would prefer complex to simple problems. 
2. I like to have the responsibility of handling a situation that requires a lot of thinking. 
3. Thinking is not my idea of fun. 
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. 
5. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something. 
6. I find satisfaction in deliberating hard and for long hours. 
7. I think only as hard as I have to. 
8. I prefer to think about small, daily projects to long-term ones. 
9. I like tasks that require little thought once I've learned them. 
10. The idea of relying on thought to make my way to the top appeals to me. 

11. I really enjoy a task that involves coming up with new solutions to problems. 
12. Learning new ways to think doesn't excite me very much. 
13. I prefer my life to be filled with puzzles that I must solve. 
14. The notion of thinking abstractly is appealing to me. 
15. I would prefer a task that is intellectual, difficult and important to one that is somewhat important but does not require much thought. 
16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort. 
17. It's enough for me that something gets the job done; I don't care how or why it works. 
18. I usually end up deliberating about issues even when they do not affect me personally. 

Thank you for taking the time to fill out this questionnaire.

Appendix A4.2: Need for Cognition Scale - Showing Reversed Items (for scoring)

1. I would prefer complex to simple problems.
2. I like to have the responsibility of handling a situation that requires a lot of thinking.
- 3*. Thinking is not my idea of fun.
- 4*. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
- 5*. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
6. I find satisfaction in deliberating hard and for long hours.
- 7*. I think only as hard as I have to.
- 8*. I prefer to think about small, daily projects to long-term ones.
- 9*. I like tasks that require little thought once I've learned them.
10. The idea of relying on thought to make my way to the top appeals to me.
11. I really enjoy a task that involves coming up with new solutions to problems.
- 12*. Learning new ways to think doesn't excite me very much.
13. I prefer my life to be filled with puzzles that I must solve.
14. The notion of thinking abstractly is appealing to me.
15. I would prefer a task that is intellectual, difficult and important to one that is somewhat important but does not require much thought.
- 16*. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
- 17*. It's enough for me that something gets the job done; I don't care how or why it works.
18. I usually end up deliberating about issues even when they do not affect me personally.

Scoring of nine asterisked questions was reversed.

(The ratings were recorded from 1 (lowest) to 9 (highest) per item.)

Appendix A5: Typical Visual Analogue Scale for Experiment 1

This scale was presented before and after each mood induction to assess current mood; i.e. the scale was presented four times as there were three mood inductions.

Subject No:

Visual Analogue Scale

Please rate how you feel right now on the following scales. Decide the position along the line which applies to you right now. For example if you are feeling more relaxed than tense then you would mark the line toward the relaxed end of the scale, say:

Relaxed

Tense

Now please complete the following scales:

Alert

Drowsy

Sad

Happy

Calm

Excited

Lethargic

Energetic

Attentive

Dreamy

Interested

Bored

Depressed

Elated

Muzzy

Focussed

Appendix A6: Scripts for Autobiographical Mood Inductions.

(These were printed one to a page and presented, one at a time, together with blank writing paper.)

For Happy Mood Induction

Autobiographical Memory Inventory

Please think about a happy event in your life and write about it. As you do this, try to relive the feelings you had at the time.

1. See all the details of the situation. Picture the surroundings and then write a description of them.
2. See the people or objects and write a description of them.
3. Hear the sounds and experience the event happening to you. Describe what you are experiencing.
4. Think the thoughts you actually thought in this situation. What are they?
5. Feel the same happy feelings you felt. Let yourself react as if you were actually there. Describe what is happening to you.

Take your time as you will have ten minutes to write down your memories.

For Neutral Mood induction

Autobiographical Memory Inventory

Please describe the details of the street in which you lived when you were about ten years old.

1. You may find it helps to draw a sketch-map or picture first.
2. Label the landmarks and objects.
3. See all the details of the situation.
4. Picture the surroundings and objects and then write a description of them.
5. You go for a walk down the street. Describe what you can see.

Take your time as you will have ten minutes to write down your memories.

For Sad Mood induction

Autobiographical Memory Inventory

Please think about a sad event in your life and write about it. As you do this, try to relive the feelings you had at the time.

1. See all the details of the situation. Picture the surroundings and then write a description of them.
2. See the people or objects and write a description of them.
3. Hear the sounds and experience the event happening to you. Describe what you are experiencing.
4. Think the thoughts you actually thought in this situation. What are they?
5. Feel the same sad feelings you felt. Let yourself react as if you were actually there. Describe what is happening to you.

Take your time as you will have ten minutes to write down your memories.

Appendix B

Protocols for Experiments 2, 3 and 4

Appendix B1: Participant Consent Form

for Mood Induction - Autobiographical Method –See Appendix A6

Appendix B2: Questionnaire - Pencil & Paper Format

Appendix B3: Scoring Schema for Self Esteem Questionnaire

for Scoring Schema for Need for Cognition Scale – See Appendix A4.2

Appendix B4: Post Experimental Awareness Questionnaire.

The various protocols for this group of experiments were presented either via computer screen, or questionnaire booklet.

The actual text was identical in both, each “screen” in the computer version (Experiments 2 and 3) corresponding to a page of the questionnaire booklet (Experiment 4).

The protocols are presented here in the questionnaire booklet version.

The pages of the questionnaire booklets have been reduced in size to 80% of original.

Appendix B1: Participant Consent Form for Experiments 2, 3 and 4

Social Cognition Laboratory

Participant Consent Form

Information for participants in social judgment studies

The research in which you are participating is concerned with factors affecting social judgments, that is judgments which involve people or social issues.

If you agree to participate, please sign and date this form after carefully reading the following section:

I consent to taking part in a psychological experiment on social judgment. I understand that this will involve (an audiovisual presentation and¹) answering some questions and making judgments about statements on social issues. I also understand that I may withdraw from the experiment at any time without prejudice.

I have read the information above and any questions I have asked have been answered to my satisfaction.

I agree that research data gathered for the study may be published provided that I cannot be identified as a subject.

Signature of subject Date

Telephone number

Name:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

Signature of investigator Date

¹ Included for Experiments 2 and 4 and omitted for Experiment 3

Social Cognition Experiment

Experiment One

Enter Subject's Name:

Enter Subject's Number:

Instructions

This experiment will involve your answering a number of questions presented in different ways.

1. A question requiring a written answer - e.g. What is your name?

(Write the answer in the box.)

2. A question requiring a Yes/No response - e.g. Are you studying Psychology?

(Write "Y" or "N" in the box.)

3. A statement with a range of options -

e.g. I am doing well in my studies.

(Tick the box under statement that you feel is the most accurate.)

Definitely false	False	Mostly false	More false than true	More true than false	Mostly true	True	Definitely true
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. A statement with a sliding scale ranging between two extremes.

e.g. Indicate your statistics ability.

(Make an "X" at the appropriate position on the line.)



Do not turn over the page until told to do so

Please tell the experimenter when you are ready to continue.

Please tick the appropriate box to indicate how true (or false) each item is as a description of you.
There are no right or wrong answers.









S.É.

	Definitely false	False	Mostly false	More false than true	More true than false	Mostly true	True	Definitely true
I have a lot of respect for myself.								
I <u>lack</u> self-confidence.								
I am pretty accepting of myself.								
I don't have much respect for myself.								
I have a lot of self-confidence.								
I have a very good self-concept.								
Nothing that I do is very important.								
I have pretty positive feelings about myself.								
I have a pretty poor self-concept.								
I have pretty negative feelings about myself.								
I do lots of things that are important.								
I am not very accepting of myself.								

(Second page of first booklet - Self esteem inventory)

Please indicate your degree of agreement or disagreement with the following statements by placing a cross at the appropriate position on the number line.


NC

1. I would prefer complex to simple problems.
Disagree strongly  Agree strongly
2. I like to have the responsibility of handling a situation that requires a lot of thinking.
Disagree strongly  Agree strongly
3. Thinking is not my idea of fun.
Disagree strongly  Agree strongly
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
Disagree strongly  Agree strongly
5. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
Disagree strongly  Agree strongly
6. I find satisfaction in deliberating hard and for long hours.
Disagree strongly  Agree strongly
7. I think only as hard as I have to.
Disagree strongly  Agree strongly
8. I prefer to think about small, daily projects to long-term ones.
Disagree strongly  Agree strongly


Please turn the page when ready, and continue the questions.

(Third page of first booklet - Need for cognition questionnaire)


9. I like tasks that require little thought once I've learned them.

Disagree strongly  Agree strongly


10. The idea of relying on thought to make my way to the top appeals to me.

Disagree strongly  Agree strongly


11. I really enjoy a task that involves coming up with new solutions to problems.

Disagree strongly  Agree strongly


12. Learning new ways to think doesn't excite me very much.

Disagree strongly  Agree strongly


13. I prefer my life to be filled with puzzles that I must solve.

Disagree strongly  Agree strongly


14. The notion of thinking abstractly is appealing to me.

Disagree strongly  Agree strongly


15. I would prefer a task that is intellectual, difficult and important to one that is somewhat important but does not require much thought.

Disagree strongly  Agree strongly


16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

Disagree strongly  Agree strongly

17. It's enough for me that something gets the job done; I don't care how or why it works.

Disagree strongly  Agree strongly

18. I usually end up deliberating about issues even when they do not affect me personally.

Disagree strongly  Agree strongly


(Fourth page of first booklet - Need for cognition questionnaire - cont.)


Are you male (M) or female (F)?


Please indicate your age in years:

Please read the following word pairs and mark with an “X” the position on the scale that refers to you at this moment.

Competent  Incompetent

Sad  Happy

Tense  Relaxed

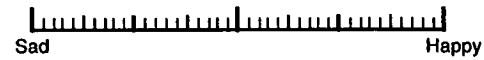
Elated  Depressed

Please stop here, until the experimenter asks you to turn the page.

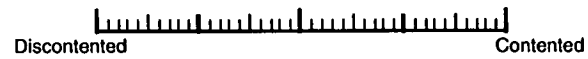
POST EXPERIMENTAL QUESTIONNAIRE

What is your (term time) post-code?

Please read the following word pairs and mark with an "X" the position on the scale that refers to you at this moment.

 Sad Happy

 Satisfied Dissatisfied

 Discontented Contented

 Relaxed Tense

My tastes in music are (please indicate more than one if desired):

☐ classical

☐ folk

☐ rock

☐ metal

☐ techno

☐ jazz/blues

other (please specify):

This is the end of the first experiment.

Social Cognition Experiment

Experiment Two

(First page of second booklet - participants told they could skip this page as it was 'already done')

Enter Subject's Number:

Instructions

This experiment will involve your answering a number of questions presented in different ways.

1. A question requiring a written answer - e.g. What is your name?
(Write the answer in the box.)

2. A question requiring a Yes/No response - e.g. Are you studying Psychology? ☐
(Write "Y" or "N" in the box.)

3. A statement with a range of options -

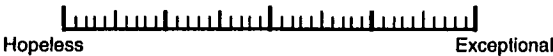
e.g. I am doing well in my studies.
(Tick the box under statement that you feel is the most accurate.)

Definitely false	False	Mostly false	More false than true	More true than false	Mostly true	True	Definitely true

4. A statement with a sliding scale ranging between two extremes.

e.g. Indicate your statistics ability.

(Make an "X" at the appropriate position on the line.)



Please turn over when you are ready to continue.

Confidence and Expectancy Ratings

On the following pages are some questions about how likely you believe you are to suffer from the effects of various practices which could be hazardous to health and about how confident you are that you could make various health-related changes.

Whether or not you are actually trying to change your habits at present, please rate how confident you are that you would be able to make yourself do regularly the things suggested, if you wanted to.

Please tell the experimenter when you are ready to continue.

Do not turn over the page until told to do so.

(Second page of second booklet - participant instructions)

Information: Excessive consumption of alcohol is associated with memory problems.

Use of **Alcohol**

*This group of questions relates to alcoholic drinks. Please tick **ONE** of the following options.*

Do you consider yourself currently:

- ☐ a non drinker
- ☐ an occasional drinker
- ☐ a moderate drinker
- ☐ a very regular drinker
- ☐ a heavy drinker?

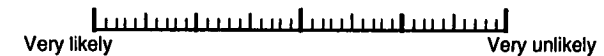
How many standard drinks would you drink in an ordinary week (Monday - Monday)?

Given your current and likely future use or non-use of alcohol, how likely do you think you are to have memory problems by the age of 70?

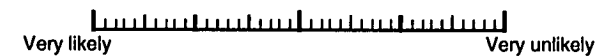


If you do not currently drink alcohol, please continue by answering the questions on the next page.

What do you believe would be your chances of reducing your alcohol intake over the next six months if you decided to?



How likely do you think you are to have memory problems by the age of 70 if you maintained your alcohol reduction in this way?



Please turn the page when ready, and continue the questionnaire.

(Third page of second booklet)

Information: Tobacco smoking is associated with an increased risk of lung cancer.

Use of **Nicotine**

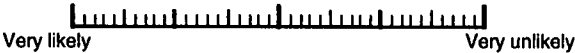
*This group of questions relates to cigarette smoking. Please tick **ONE** of the following options.*

Do you consider yourself currently:

- ☐ a non-smoker
- ☐ an occasional smoker
- ☐ a moderate smoker
- ☐ a very regular smoker
- ☐ a heavy smoker?

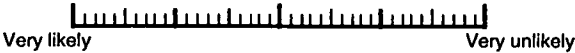
How many cigarettes would you smoke in a normal day?

Given your current and likely future use or non-use of tobacco, how likely do you think you are to have contracted lung cancer by the age of 70?

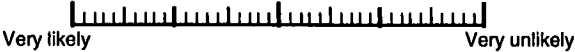


If you are a non-smoker, please continue by answering the questions on the next page.

What do you believe would be your chances of reducing your use of nicotine over the next six months if you decided to?



How likely do you think you are to have lung cancer by the age of 70 if you maintained your nicotine reduction in this way?



Please turn the page when ready, and continue the questionnaire.

(Fourth page of second booklet)

Information: Cannabis use is associated with attention and memory problems.

Use of Cannabis

*This group of questions relates to cannabis use. Please tick **ONE** of the following options.*

Do you consider yourself currently:

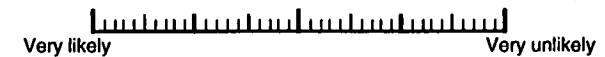
- ☐ a non-user
☐ an occasional user
☐ a moderate user
☐ a very regular user
☐ a heavy user?

How many times each week would you use cannabis?

Estimate of hours per week:

Please mark the scale with a cross at the appropriate place.

Given your current and likely future use or non-use of cannabis, how likely do you think you are to have attention and memory problems by the age of 70?

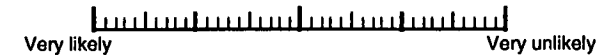


If you do not currently use cannabis, continue by answering the questions on the next page.

What do you believe would be your chances of reducing your cannabis use over the next six months if you decided to?



How likely do you think you are to have attention and memory problems by the age of 70 if you maintained your reduced cannabis use in this way?



Please turn the page when ready, and continue the questionnaire.

(Fifth page of second booklet)

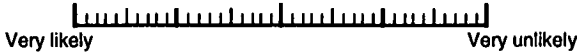
Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).

Exercise

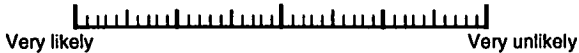
Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?



What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?



How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?



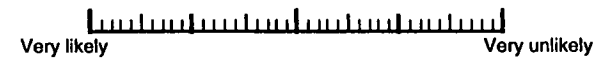
Please turn the page when ready, and continue the questionnaire.

(Sixth page of second booklet)

Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).

Fat intake

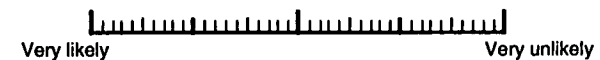
Given your current and likely future fat intake, how likely do you think you are to suffer cardiovascular disease by the age of 70?



What do you believe would be your chances of reducing your fat intake over the next six months if you decided to?



How likely do you think you are to have cardiovascular disease by the age of 70 if you maintained your fat reduction in this way?



Please turn the page when ready, and continue the questionnaire.

(Seventh page of second booklet)

Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.

Fruit & Vegetable intake

Given your current and likely future fruit and vegetable intake, how likely do you think you are to have a heart attack, stroke or cancer before the age of 70?



What do you think are your chances of increasing your fruit and vegetable intake over the next six months if you decided to?



How likely do you think you are to have a heart attack, stroke or cancer by the age of 70 if you maintained your increased fruit and vegetable intake?



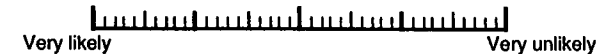
Please turn the page when ready, and continue the questionnaire.

(Eighth page of second booklet)

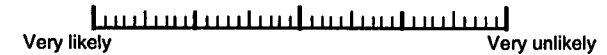
Information: Sexually transmitted diseases include hepatitis B, AIDS, herpes, gonorrhoea, syphilis.
Safer sex is taken to mean using a condom if you are involved in sexual activity.

Safer
Sex

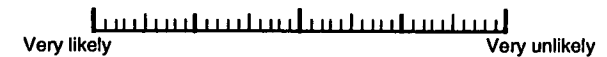
Given your current and likely future sexual practices, how likely do you think you are to have contracted a sexually transmitted disease before the age of 70?



What do you believe would be your chances of practicing only safer sex over the next six months if you decided to?



How likely do you think you are to have contracted a sexually transmitted disease by the age of 70 if you maintained using safer sex practices?



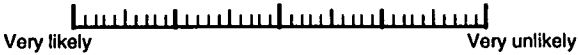
Please turn the page when ready, and continue the questionnaire.

(Ninth page of second booklet)

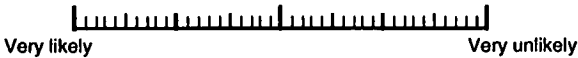
Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.

UV Protection

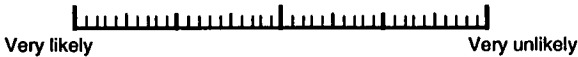
Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?



What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?



How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?





Please turn the page when ready, and continue.

(Tenth page of second booklet)

Please read the following word pairs and mark with an “X” the position on the scale that refers to you at this moment.

Alert  Drowsy

Sad  Happy

Dreamy  Attentive

End of Experiment

Thank you for your participation.

(Last page of second booklet - Mood maintenance check)

Appendix B3: Scoring Schema for Self Esteem Questionnaire

1. I have a lot of respect for myself.
- 2*. I lack self-confidence.
3. I am pretty accepting of myself.
- 4*. I don't have much respect for myself.
5. I have a lot of self-confidence.
6. I have a very good self-concept.
- 7*. Nothing that I do is very important.
8. I have pretty positive feelings about myself.
- 9*. I have a pretty poor self-concept.
- 10*. I have pretty negative feelings about myself.
11. I do lots of things that are important.
- 12*. I am not very accepting of myself.

** Scoring of the six asterisked questions was reversed.*

The ratings were recorded from 1 (lowest) to 8 (highest) per item.

Appendix B4: Post Experimental Awareness Questionnaire

Post-experimental Questionnaire

Subject No

As the first part of your debriefing could you please answer these questions.

1. Had you heard anything about this experiment from any other source? *Yes/No*

What had you heard?

2. What did you think the purpose of the experiment was?

3. Is there anything about which you were thinking which it might be relevant for me to know, while you were carrying out the tasks, watching the video etc?

4. Do you have any comments about the procedure?

5. Do you have any other comments?

Thank you for your cooperation.

Appendix C

Protocols for Experiment 5

Appendix C1: Participant Consent form

Appendix C2: Questionnaire Booklet “*Very likely*” First Version

Appendix C3: Questionnaire Booklet “*Very unlikely*” First Version

Appendix C1: Participant Consent Form for Experiment 5

Health and Social Cognition Experiment

Participant Consent Form

Information for participants in health judgment studies

The research in which you are participating is broadly concerned with factors affecting social judgments, that is judgments which involve people or social issues. This particular experiment is concerned with health-related judgments.

If you agree to participate, please sign and date this form after carefully reading the following section:

I consent to taking part in a psychological experiment on health-related judgment. I understand that this will involve answering some questions and making judgments about statements on health-related issues. I also understand that I may withdraw from the experiment at any time without prejudice.

I have read the information above and any questions I have asked have been answered to my satisfaction.

I agree that research data gathered for the study may be published provided that I cannot be identified as a subject.

Signature of participant Date

Name:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

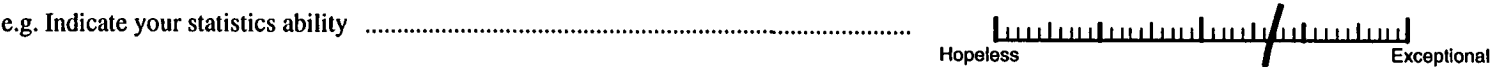
Signature of investigator Date

Health Ratings Experiment

LU

Instructions

You will be asked to answer a number of questions.
You are asked to do this by putting a line through a scale to indicate your rating.
For example, if you were asked to indicate your statistics ability, you would put a line through the scale at the appropriate place.
If you were quite good at statistics you might put your line as shown.



You will also be asked to note down the time on the display clock at various stages during the experiment. It is important to note the time accurately.
There is no need to rush your answers.

Please give your age: (years)
Are you: Male Female (please circle)

Likelihood ratings (D& B)

On the following pages are some questions about how likely you are to suffer from the effects of various practices which could be hazardous to health and about how confident you are that you could make various health-related changes.

Whether or not you are actually trying to change your habits at present, please rate how confident you are that you would be able to make yourself do regularly the things suggested, if you wanted to.

Please note down the time from the display clock

	:	
min		sec

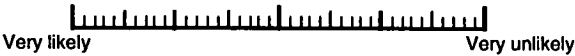
then turn over immediately and begin.

(Second Page - Questionnaire Booklet - "Very likely" First Version)

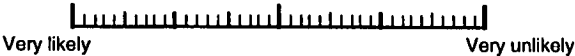
Likelihood ratings (D& B)

- **Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).**

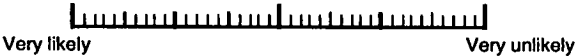
Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?



What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

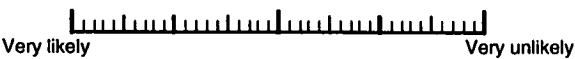


How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?



- **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

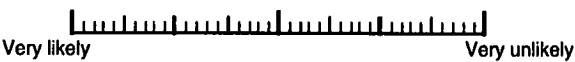
Given your current and likely future fat intake, how likely do you think you are to suffer cardiovascular disease by the age of 70?



What do you believe would be your chances of reducing your fat intake over the next six months if you decided to?

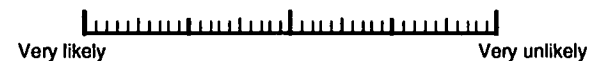


How likely do you think you are to have cardiovascular disease by the age of 70 if you maintained your fat reduction in this way?

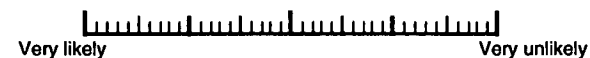


- Information:** Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.

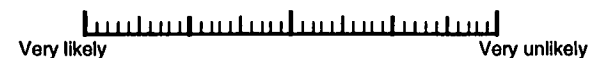
Given your current and likely future fruit and vegetable intake, how likely do you think you are to have a heart attack, stroke or cancer before the age of 70?



What do you think are your chances of increasing your fruit and vegetable intake over the next six months if you decided to?

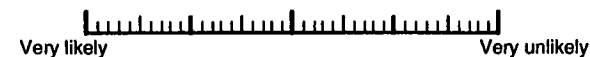


How likely do you think you are to have a heart attack, stroke or cancer by the age of 70 if you maintained your increased fruit and vegetable intake?

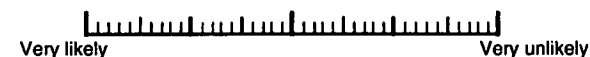


- Information:** Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.

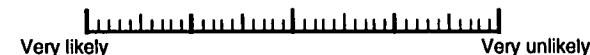
Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?



What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?



How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?



Please note down the time from the display clock

	:	
min		sec

then turn over.

Likelihood ratings (S& B)


For each of the following items, please use the scale to indicate the likelihood that you will experience the situation at some stage in your life.


Please note down the time from the display clock

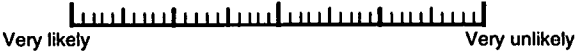
	:	
min		sec

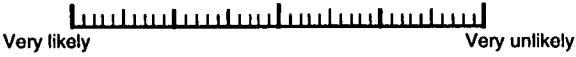
 then turn over immediately and continue.

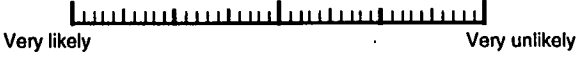
Likelihood ratings (S& B)

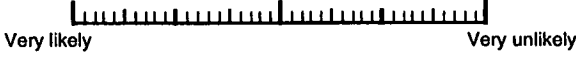
- Contracting some form of cancer.


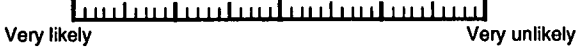
Very likely Very unlikely
- Achieving great cardiac fitness.


Very likely Very unlikely
- Developing high blood pressure.


Very likely Very unlikely
- Becoming an alcoholic.


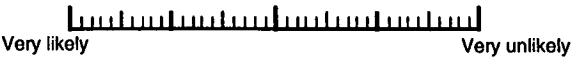
Very likely Very unlikely
- Regularly maintaining a well balanced diet.


Very likely Very unlikely
- Developing diabetes.


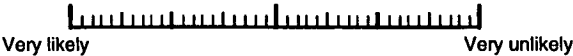
Very likely Very unlikely
- Regularly maintaining an exercise program.


Very likely Very unlikely

- Lowering cholesterol levels.



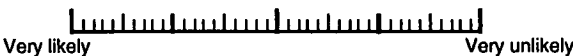
- Developing arthritis.



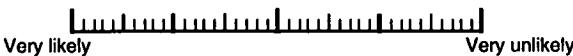
- Having a stroke.



- Learning relaxation skills and reducing tension.



- Reducing exposure to toxic substances.



Please note down the time from the display clock

:

min

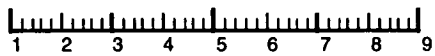
sec

then turn over.

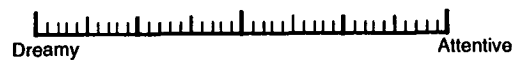
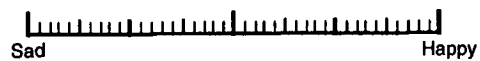
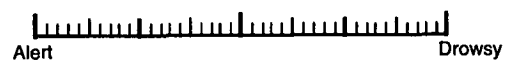
Did you find the scales confusing? Yes/No.

Would you have found it easier if the scales had been reversed? Yes/No.

Please rate the scales you have completed for ease of use (1 = easiest, 9= hardest)



Please read the following word pairs and mark with an "X" the position on the scale that refers to you at this moment.



End of Experiment

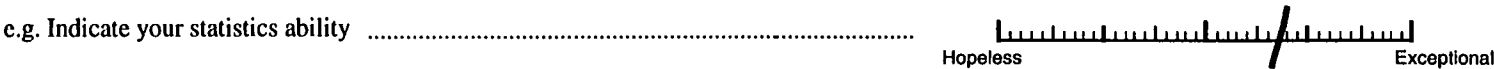
Thank you for your participation.

Health Ratings Experiment

UL

Instructions

You will be asked to answer a number of questions.
You are asked to do this by putting a line through a scale to indicate your rating.
For example, if you were asked to indicate your statistics ability, you would put a line through the scale at the appropriate place.
If you were quite good at statistics you might put your line as shown.



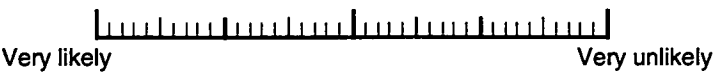
You will also be asked to note down the time on the display clock at various stages during the experiment. It is important to note the time accurately.
There is no need to rush your answers.

Please give your age: (years)
Are you: Male Female (please circle)

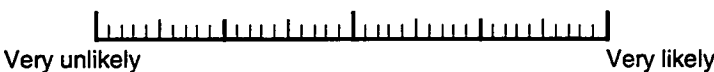
(Subsequent Pages - Questionnaire Booklet - “Very unlikely” First’ Version)

NOTE: The subsequent pages of this questionnaire booklet are identical to those of “Very likely” first’ booklet from this point on (i.e. for pages two to nine), except for the reversal of the wording on the scales.

“Very likely” first’ questionnaire booklet scales (printed in full earlier)



“Very unlikely” first’ questionnaire booklet scales



Appendix D

Protocols for Experiment 6

Appendix D1: Participant Consent Form

Appendix D2: Questionnaire Booklet

Social Cognition Laboratory
Participant Consent Form

Information for participants in social judgment studies

The research in which you are participating is broadly concerned with factors affecting social judgments, that is judgments which involve people or social issues.

If you agree to participate, please sign and date this form after carefully reading the following section:

I consent to taking part in a psychological experiment on social judgment. I understand that this will involve making judgments about statements on social issues. I also understand that I may withdraw from the experiment at any time without prejudice.

I have read the information above and any questions I have asked have been answered to my satisfaction.

I agree that research data gathered for the study may be published provided that I cannot be identified as a subject.

Signature of participant Date

Name:

Telephone Number:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

Signature of investigator Date

Appendix D2: Questionnaire Booklet Experiment 6

Notes

Each questionnaire booklet was made up of a number of sections.

The available sections were:

- | | | | |
|----|--|----------------|----------|
| a. | Questions type “D&B”, for ‘self’, | with scales | (1+2 pp) |
| b. | Questions type “D&B”, for ‘self’, | without scales | (2 pp) |
| c. | Questions type “D&B” for ‘av student’ and ‘self’ | with scales | (1+3 pp) |
| d. | Questions type “D&B” for ‘av student’ and ‘self’ | without scales | (3 pp) |
| e. | Questions type “S&B” for ‘self’ | with scales | (1+2 pp) |
| f. | Questions type “S&B” for ‘self’ | without scales | (2 pp) |
| g. | Questions type “S&B” for ‘av student’ and ‘self’ | with scales | (1+3 pp) |
| h. | Questions type “S&B” for ‘av student’ and ‘self’ | without scales | (3 pp) |
| i. | Final mood rating | | (1 p) |
| j. | Post-experimental questionnaire | | (1 p) |

These sections are reproduced below in the above order (at 80% reduction).

The questionnaire booklets used by participants were of four types, comprising the sections as listed.

- | | | |
|---------|-------------------|---|
| Type A: | a. e. b. f. i. j. | } (Counterbalanced order, ‘self’ type). |
| Type B: | e. a. f. b. i. j. | |
| Type C: | c. d. g. h. i. j. | } (Counterbalanced order, ‘average’ and ‘self’ type). |
| Type D: | d. c. h. g. i. j. | |

Likelihood ratings (D& B)

On the following pages are some questions about how likely you are to suffer from the effects of various practices which could be hazardous to health and about how confident you are that you could make various health-related changes.

Whether or not you are actually trying to change your habits at present, please rate how confident you are that you would be able to make yourself do regularly the things suggested, if you wanted to.

Please tell the experimenter when you are ready to continue.
Do not turn over the page until told to do so.

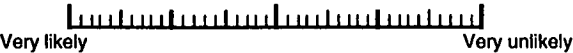
Likelihood ratings (D& B)

- **Information:** Excessive consumption of alcohol is associated with memory problems.

Given your current and likely future use or non-use of alcohol, how likely do you think you are to have memory problems by the age of 70?



What do you believe would be your chances of reducing your alcohol intake over the next six months if you decided to?

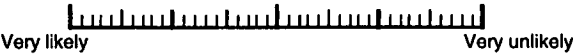


How likely do you think you are to have memory problems by the age of 70 if you maintained your alcohol reduction in this way?

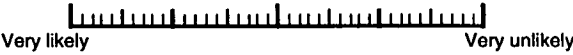


- **Information:** Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).

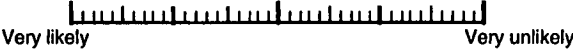
Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?



What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

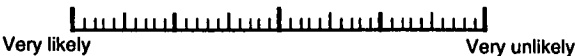


How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?



- **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

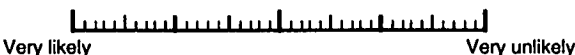
Given your current and likely future fat intake, how likely do you think you are to suffer cardiovascular disease by the age of 70?



What do you believe would be your chances of reducing your fat intake over the next six months if you decided to?

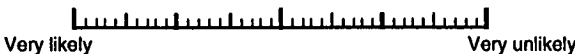


How likely do you think you are to have cardiovascular disease by the age of 70 if you maintained your fat reduction in this way?

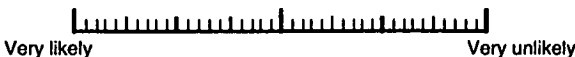


- **Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.**

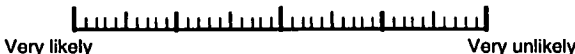
Given your current and likely future fruit and vegetable intake, how likely do you think you are to have a heart attack, stroke or cancer before the age of 70?



What do you think are your chances of increasing your fruit and vegetable intake over the next six months if you decided to?



How likely do you think you are to have a heart attack, stroke or cancer by the age of 70 if you maintained your increased fruit and vegetable intake?

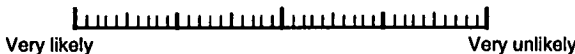


- **Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.**

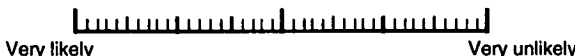
Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?



What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?



How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?



Likelihood ratings (D& B)

- **Information:** Excessive consumption of alcohol is associated with memory problems.

Given your current and likely future use or non-use of alcohol, how likely do you think you are to have memory problems by the age of 70?

What do you believe would be your chances of reducing your alcohol intake over the next six months if you decided to?

How likely do you think you are to have memory problems by the age of 70 if you maintained your alcohol reduction in this way?

- **Information:** Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).

Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?

What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?

- **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

Given your current and likely future fat intake, how likely do you think you are to suffer cardiovascular disease by the age of 70?

What do you believe would be your chances of reducing your fat intake over the next six months if you decided to?

How likely do you think you are to have cardiovascular disease by the age of 70 if you maintained your fat reduction in this way?

- **Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.**

Given your current and likely future fruit and vegetable intake, how likely do you think you are to have a heart attack, stroke or cancer before the age of 70?

What do you think are your chances of increasing your fruit and vegetable intake over the next six months if you decided to?

How likely do you think you are to have a heart attack, stroke or cancer by the age of 70 if you maintained your increased fruit and vegetable intake?

- **Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.**

Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?

What do you believe would be your chances of increasing your use of blackout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?

How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blackout (15+) and/or worn protective clothing?

Likelihood ratings (D& B)

On the following pages are some questions about the likelihood of a person suffering from the effects of various practices which could be hazardous to health and about their confidence in making various health-related changes.

For each item, please indicate on the scale, first, the ratings you think the average student would make, and, second, the ratings you would make (whether or not you are actually trying to change your habits at present). Please rate how confident you think they, and then you, would be that they/you would be able to do regularly the things suggested if they/you wanted to.

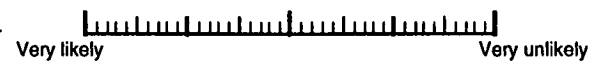
Please tell the experimenter when you are ready to continue.
Do not turn over the page until told to do so.

Likelihood ratings (D& B)

- **Information:** Excessive consumption of alcohol is associated with memory problems.

Given their/your current and likely future use or non-use of alcohol, how likely do you think they/you are to have memory problems by the age of 70?

Av. Uni student:

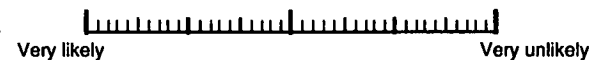


Yourself:

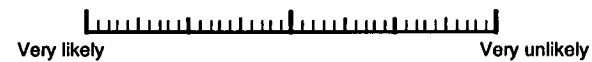


What do you believe would be their/your chances of reducing their/your alcohol intake over the next six months if you decided to?

Av. Uni student:

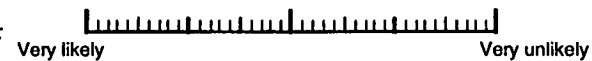


Yourself:

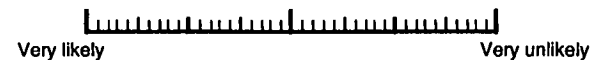


How likely do you think they/you are to have memory problems by the age of 70 if they/you maintained your alcohol reduction in this way?

Av. Uni student:





Yourself:




• **Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).**


Given your/their current and likely future exercise level, how likely do you think they/you are to have cardiovascular disease before the age of 70?

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely

What do you believe would be their/your chances of sticking to a regular exercise program over the next six months if they/you decided to?

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely


How likely do you think they/you are to have a heart attack by the age of 70 if they/you maintained a regular exercise program?


Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely


• **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**


Given their/your current and likely future fat intake, how likely do you think they/you are to suffer cardiovascular disease by the age of 70?

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


What do you believe would be their/your chances of reducing their/your fat intake over the next six months if you decided to?

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

How likely do you think they/you are to have cardiovascular disease by the age of 70 if you maintained their/your fat reduction in this way?

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

- **Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.**

Given their/your current and likely future fruit and vegetable intake, how likely do you think they/you are to have a heart attack, stroke or cancer before the age of 70?

Av. Uni student:



Yourself:

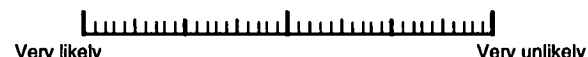


What do you think are their/your chances of increasing their/your fruit and vegetable intake over the next six months if you decided to?

Av. Uni student:

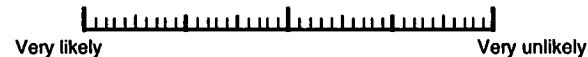


Yourself:

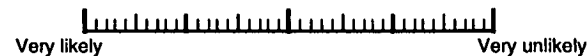


How likely do you think they/you are to have a heart attack, stroke or cancer by the age of 70 if they/you maintained your increased fruit and vegetable intake?

Av. Uni student:



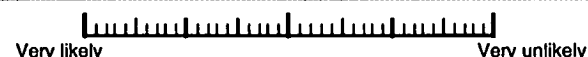
Yourself:



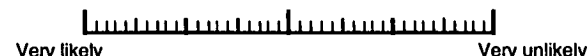
- **Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.**

Given their/your current and likely future exposure to the sun, how likely do you think they/you are to have contracted skin cancer before the age of 70?

Av. Uni student:

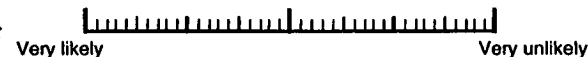


Yourself:



What do you believe would be their/your chances of increasing their/your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if they/you decided to?

Av. Uni student:

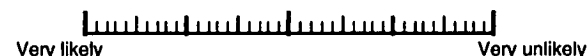


Yourself:



How likely do you think they/you are to have contracted skin cancer by the age of 70 if they/you have used blockout (15+) and/or worn protective clothing?

Av. Uni student:



Yourself:



Likelihood ratings (D&B)

- **Information:** Excessive consumption of alcohol is associated with memory problems.

Given their/your current and likely future use or non-use of alcohol, how likely do you think they/you are to have memory problems by the age of 70?

What do you believe would be their/your chances of reducing their/your alcohol intake over the next six months if you decided to?

How likely do you think they/you are to have memory problems by the age of 70 if they/you maintained your alcohol reduction in this way?

- **Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).**

Given your/their current and likely future exercise level, how likely do you think they/you are to have cardiovascular disease before the age of 70?

What do you believe would be their/your chances of sticking to a regular exercise program over the next six months if they/you decided to?

How likely do you think they/you are to have a heart attack by the age of 70 if they/you maintained a regular exercise program?

- **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

Given their/your current and likely future fat intake, how likely do you think they/you are to suffer cardiovascular disease by the age of 70?

What do you believe would be their/your chances of reducing their/your fat intake over the next six months if you decided to?

How likely do you think they/you are to have cardiovascular disease by the age of 70 if you maintained their/your fat reduction in this way?

- **Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.**

Given their/your current and likely future fruit and vegetable intake, how likely do you think they/you are to have a heart attack, stroke or cancer before the age of 70?

What do you think are their/your chances of increasing their/your fruit and vegetable intake over the next six months if you decided to?

How likely do you think they/you are to have a heart attack, stroke or cancer by the age of 70 if they/you maintained your increased fruit and vegetable intake?

- **Information: Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.**

Given their/your current and likely future exposure to the sun, how likely do you think they/you are to have contracted skin cancer before the age of 70?

What do you believe would be their/your chances of increasing their/your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if they/you decided to?

How likely do you think they/you are to have contracted skin cancer by the age of 70 if they/you have used blockout (15+) and/or worn protective clothing?

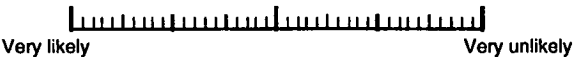
Likelihood ratings (S& B)

For each of the following items, please use the scale to indicate the likelihood that you will experience the situation at some stage in your life.

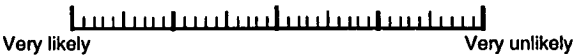
*Please tell the experimenter when you are ready to continue.
Do not turn over the page until told to do so.*

Likelihood ratings (S& B)

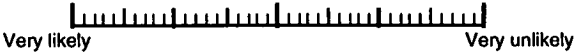
- Contracting some form of cancer.



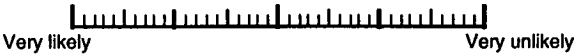
- Being a victim of fire.



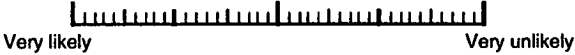
- Achieving great cardiac fitness.



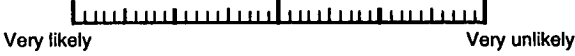
- Being the victim of a violent street crime.



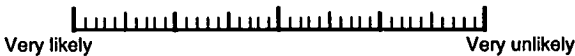
- Developing high blood pressure.



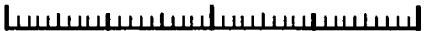







- Becoming an alcoholic.



- Regularly maintaining a well balanced diet.



- Developing diabetes.

Very likely Very unlikely
- Regularly maintaining an exercise program.

Very likely Very unlikely
- Lowering cholesterol levels.

Very likely Very unlikely
- Developing arthritis.

Very likely Very unlikely
- Being involved in a car accident.

Very likely Very unlikely
- Having a stroke.

Very likely Very unlikely
- Learning relaxation skills and reducing tension.

Very likely Very unlikely
- Reducing exposure to toxic substances.

Very likely Very unlikely

Likelihood ratings (S& B)

- Contracting some form of cancer.
- Being a victim of fire.
- Achieving great cardiac fitness.
- Being the victim of a violent street crime.
- Developing high blood pressure.
- Becoming an alcoholic.
- Regularly maintaining a well balanced diet.

- Developing diabetes.
- Regularly maintaining an exercise program.
- Lowering cholesterol levels.
- Developing arthritis.
- Being involved in a car accident.
- Having a stroke.
- Learning relaxation skills and reducing tension.
- Reducing exposure to toxic substances.


Likelihood ratings (S& B)


For each of the following items, please use the scale to indicate, first, the likelihood that the average student your age would experience the situation in their lifetime and, second, the likelihood that you will experience the situation at some stage in your life.

***Please tell the experimenter when you are ready to continue.
Do not turn over the page until told to do so.***


Likelihood ratings (S& B)


- Contracting some form of cancer.

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely


- Being a victim of fire.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


- Achieving great cardiac fitness.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


- Being the victim of a violent street crime.

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

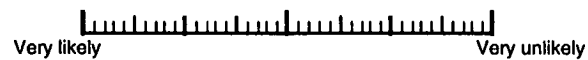
- Developing high blood pressure.

Av. Uni student:  Very likely Very unlikely

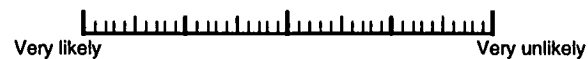
Yourself:  Very likely Very unlikely

- Becoming an alcoholic.

Av. Uni student:



Yourself:

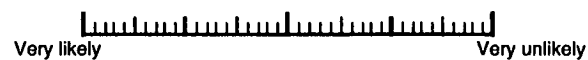


- Regularly maintaining a well balanced diet.

Av. Uni student:



Yourself:

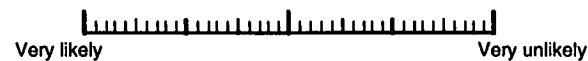


- Developing diabetes.

Av. Uni student:

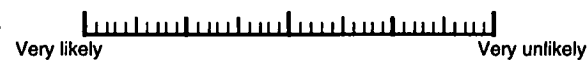


Yourself:

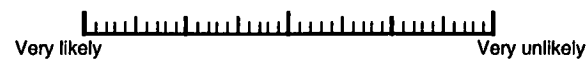


- Regularly maintaining an exercise program.

Av. Uni student:

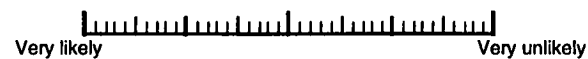


Yourself:

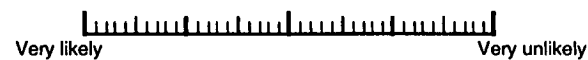


- Lowering cholesterol levels.

Av. Uni student:

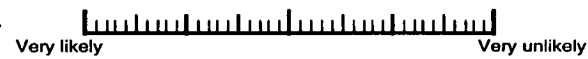


Yourself:

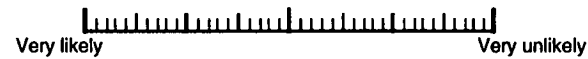










- Developing arthritis.

Av. Uni student:



Yourself:



<ul style="list-style-type: none"> Being involved in a car accident. 	<p>Av. Uni student: </p> <p>Very likely Very unlikely</p> <p>Yourself: </p> <p>Very likely Very unlikely</p>
<ul style="list-style-type: none"> Having a stroke. 	<p>Av. Uni student: </p> <p>Very likely Very unlikely</p> <p>Yourself: </p> <p>Very likely Very unlikely</p>
<ul style="list-style-type: none"> Learning relaxation skills and reducing tension. 	<p>Av. Uni student: </p> <p>Very likely Very unlikely</p> <p>Yourself: </p> <p>Very likely Very unlikely</p>
<ul style="list-style-type: none"> Reducing exposure to toxic substances. 	<p>Av. Uni student: </p> <p>Very likely Very unlikely</p> <p>Yourself: </p> <p>Very likely Very unlikely</p>

Likelihood ratings (S& B)

- Contracting some form of cancer.

- Being a victim of fire.

- Achieving great cardiac fitness.

- Being the victim of a violent street crime.

- Developing high blood pressure.

- Becoming an alcoholic.

- Regularly maintaining a well balanced diet.

- Developing diabetes.

- Regularly maintaining an exercise program.

- Lowering cholesterol levels.

- Developing arthritis.

<ul style="list-style-type: none">• Being involved in a car accident.	
<ul style="list-style-type: none">• Having a stroke.	
<ul style="list-style-type: none">• Learning relaxation skills and reducing tension.	
<ul style="list-style-type: none">• Reducing exposure to toxic substances.	

Please read the following word pairs and mark with an “X” the position on the scale that refers to you at this moment.



End of Experiment

Thank you for your participation.

Post - experimental questionnaire

Has anything affected your mood over the last few days? Yes / No (Please circle).

If yes, please indicate whether this is likely to have made you happier or sadder than usual: Happier / Sadder (Please circle).

Before your debriefing, are there any other comments you would like to make?

Appendix E

Protocols for Experiment 7

Appendix E1 Participant Consent Form

Appendix E2: Health Inventory

Appendix E3: Mood Induction Scripts (“Autobiographical Memory Inventory”)

Appendix E4: Questionnaire Booklet

Health and Social Cognition Laboratory
Participant Consent Form

Information for participants in health judgment studies

The research in which you are participating is broadly concerned with factors affecting social judgments, that is judgments which involve people or social issues. This particular experiment is concerned with health-related judgments.

If you agree to participate, please sign and date this form after carefully reading the following section:

I consent to taking part in a psychological experiment on health-related judgment. I understand that this will involve answering some questions and making judgments about statements on health-related issues. I also understand that I may withdraw from the experiment at any time without prejudice.

I have read the information above and any questions I have asked have been answered to my satisfaction.

I agree that research data gathered for the study may be published provided that I cannot be identified as a subject.

Signature of participant Date

Name:

Telephone Number:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that s/he understands the implications of participation.

Signature of investigator Date

Appendix E2: Health Inventory

Health Inventory

Below is a list of physical troubles. Please indicate which of these has bothered you during the past week, and which of these are also bothering you today.

Then rate how much discomfort, on average, each of these symptoms has caused you during the past week.

Please rate them by circling the appropriate answer.

		Today		Past Week		Amount of discomfort				
						None	Little	Some	Moderate	Severe
1.	Nausea	yes	no	yes	no	0	1	2	3	4
2.	Headache	yes	no	yes	no	0	1	2	3	4
3.	Neck aches and pains	yes	no	yes	no	0	1	2	3	4
4.	Flashes of hot and cold	yes	no	yes	no	0	1	2	3	4
5.	Aches and pains	yes	no	yes	no	0	1	2	3	4
6.	Shakiness	yes	no	yes	no	0	1	2	3	4
7.	Difficulty sleeping	yes	no	yes	no	0	1	2	3	4
8.	Back aches	yes	no	yes	no	0	1	2	3	4
9.	Stomach trouble	yes	no	yes	no	0	1	2	3	4
10.	Stuffy nose	yes	no	yes	no	0	1	2	3	4
11.	Sore throat	yes	no	yes	no	0	1	2	3	4
12.	Excessive perspiration	yes	no	yes	no	0	1	2	3	4
13.	Runny nose	yes	no	yes	no	0	1	2	3	4
14.	Fever (high temperature)	yes	no	yes	no	0	1	2	3	4
15.	Feeling tired	yes	no	yes	no	0	1	2	3	4
16.	Itchy or watery eyes	yes	no	yes	no	0	1	2	3	4
17.	Muscular weakness	yes	no	yes	no	0	1	2	3	4
18.	Dizzy spells	yes	no	yes	no	0	1	2	3	4
19.	Difficulty breathing	yes	no	yes	no	0	1	2	3	4
20.	Sleeping to excess	yes	no	yes	no	0	1	2	3	4

21. Difficulty swallowing	yes	no	yes	no	0	1	2	3	4
22. Muscular tension	yes	no	yes	no	0	1	2	3	4
23. Appetite changes	yes	no	yes	no	0	1	2	3	4
24. Bowel trouble	yes	no	yes	no	0	1	2	3	4
25. Vomiting	yes	no	yes	no	0	1	2	3	4
26. Chest pains	yes	no	yes	no	0	1	2	3	4
27. Coughing	yes	no	yes	no	0	1	2	3	4
28. Sleepiness	yes	no	yes	no	0	1	2	3	4

Appendix E3: Scripts for Autobiographical Mood Inductions.

For Happy Mood Induction

Autobiographical Memory Inventory

Please think about a happy event in your life and write about it. As you do this, try to relive the feelings you had at the time.

1. See all the details of the situation. Picture the surroundings and then write a description of them.
2. See the people or objects and write a description of them.
3. Hear the sounds and experience the event happening to you. Describe what you are experiencing.
4. Think the thoughts you actually thought in this situation. What are they?
5. Feel the same happy feelings you felt. Let yourself react as if you were actually there. Describe what is happening to you.

Take your time as you will have ten minutes to write down your memories.

For Sad Mood induction

Autobiographical Memory Inventory

Please think about a sad event in your life and write about it. As you do this, try to relive the feelings you had at the time.

1. See all the details of the situation. Picture the surroundings and then write a description of them.
2. See the people or objects and write a description of them.
3. Hear the sounds and experience the event happening to you. Describe what you are experiencing.
4. Think the thoughts you actually thought in this situation. What are they?
5. Feel the same sad feelings you felt. Let yourself react as if you were actually there. Describe what is happening to you.

Take your time as you will have ten minutes to write down your memories.

Appendix E4: Questionnaire Booklet

Notes

Each questionnaire booklet was made up of a number of sections.

The available sections were:

- | | | |
|----|---|----------------------|
| a. | An instruction page for answering the visual analogue scales etc. | (1 p) |
| b. | Questions type “D&B”, for ‘self’, | with scales (1+2 pp) |
| c. | Questions type “D&B” for ‘av student’ and ‘self’ | with scales (1+3 pp) |
| d. | Questions type “S&B” for ‘self’ | with scales (1+2 pp) |
| e. | Questions type “S&B” for ‘av student’ and ‘self’ | with scales (1+3 pp) |
| f. | Final mood rating | (1 p) |
| g. | Post-experimental questionnaire | (1 p) |

(Sections b. to e. each contain an extra, introductory, explanatory page.)

These sections are reproduced below in the above order (at 80% reduction).

The questionnaire booklets used by participants were of four types, comprising the sections as listed.

- | | | |
|---------|------------------|---|
| Type A: | a. b. d. f. g. } | (Counterbalanced order, ‘self’ type). |
| Type B: | a. d. b. f. g. } | |
| Type C: | a. c. e. f. g. } | (Counterbalanced order, ‘average’ and ‘self’ type). |
| Type D: | a. e. c. f. g. } | |

A Health Ratings Experiment

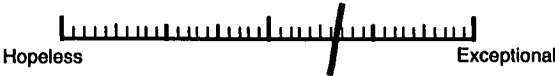
You will be asked to answer a number of questions.

You are asked to do this by putting a line through a scale to indicate your rating.

For example, if you were asked to indicate your statistics ability, you would put a line through the scale at the appropriate place.

If you were quite good at statistics you might put your line as shown.

e.g. Indicate your statistics ability



You will also be asked to note down the time on the display clock at various stages during the experiment. It is important to note the time accurately.

Please give your age: (years)

Are you: Male Female (please circle)

Section a.

Instruction page for answering the visual analogue scales etc.

Health Ratings Experiment

On the following pages are some questions about how likely you are to suffer from the effects of various practices which could be hazardous to health and about how confident you are that you could make various health-related changes.

Whether or not you are actually trying to change your habits at present, please rate how confident you are that you would be able to make yourself do regularly the things suggested, if you wanted to.

Please note down the time from the display clock

_____	:	_____
min		sec

then turn over immediately and begin.

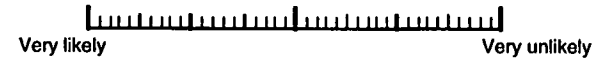
Section b.

Questions type "D&B", for 'self' (intro page)

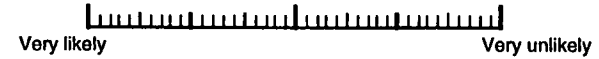
Likelihood ratings (D & B)

- **Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).**

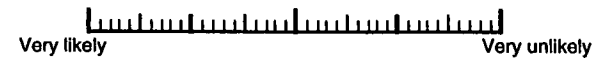
Given your current and likely future exercise level, how likely do you think you are to have cardiovascular disease before the age of 70?



What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

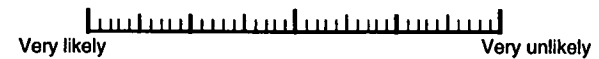


How likely do you think you are to have a heart attack by the age of 70 if you maintained a regular exercise program?

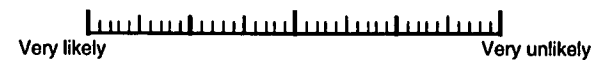


- **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

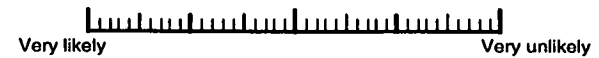
Given your current and likely future fat intake, how likely do you think you are to suffer cardiovascular disease by the age of 70?



What do you believe would be your chances of reducing your fat intake over the next six months if you decided to?



How likely do you think you are to have cardiovascular disease by the age of 70 if you maintained your fat reduction in this way?



Section b.

Questions type "D&B", for 'self' (first page)

- **Information:** Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.

Given your current and likely future fruit and vegetable intake, how likely do you think you are to have a heart attack, stroke or cancer before the age of 70?



What do you think are your chances of increasing your fruit and vegetable intake over the next six months if you decided to?

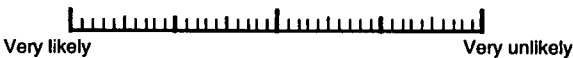


How likely do you think you are to have a heart attack, stroke or cancer by the age of 70 if you maintained your increased fruit and vegetable intake?

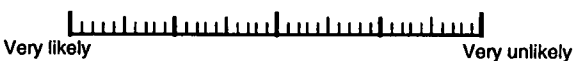


- **Information:** Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.

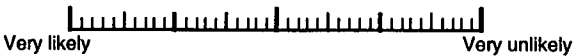
Given your current and likely future exposure to the sun, how likely do you think you are to have contracted skin cancer before the age of 70?



What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?



How likely do you think you are to have contracted skin cancer by the age of 70 if you have used blockout (15+) and/or worn protective clothing?



Please note down the time from the display clock

:

min

sec

then turn over.

Likelihood ratings (D & B)

On the following pages are some questions about the likelihood of a person suffering from the effects of various practices which could be hazardous to health and about their confidence in making various health-related changes.

For each item, please indicate on the scale, first, the ratings you think the average student would make, and, second, the ratings you would make (whether or not you are actually trying to change your habits at present). Please rate how confident you think they, and then you, would be that they/you would be able to do regularly the things suggested if they/you wanted to.

Please note down the time from the display clock

<div></div>	:	<div></div>
min		sec

then turn over immediately and begin.

Likelihood ratings (D & B)

- Information: Regular exercise is associated with reduced risk of cardiovascular disease (heart attack or stroke).

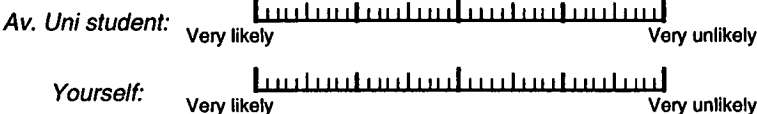
Given your/their current and likely future exercise level, how likely do you think they/you are to have cardiovascular disease before the age of 70?



What do you believe would be their/your chances of sticking to a regular exercise program over the next six months if they/you decided to?

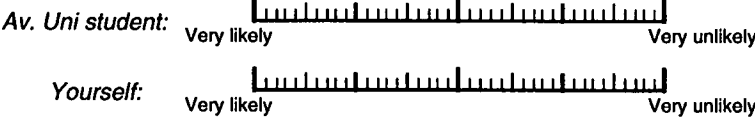


How likely do you think they/you are to have a heart attack by the age of 70 if they/you maintained a regular exercise program?

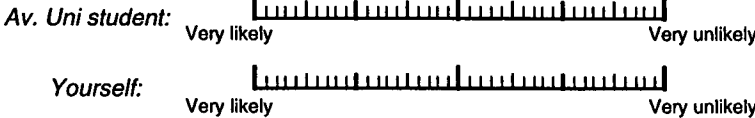


• **Information: Excessive fat intake is associated with increased risk of cardiovascular disease (heart attack or stroke).**

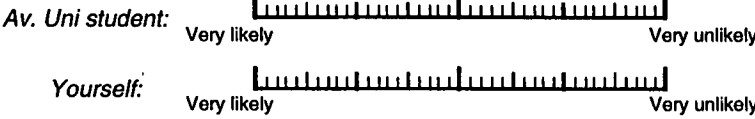
Given their/your current and likely future fat intake, how likely do you think they/you are to suffer cardiovascular disease by the age of 70?



What do you believe would be their/your chances of reducing their/your fat intake over the next six months if you decided to?



How likely do you think they/you are to have cardiovascular disease by the age of 70 if you maintained their/your fat reduction in this way?

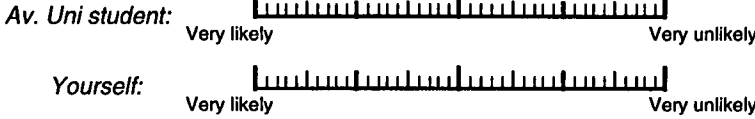


• **Information: Daily intake of fresh fruit and vegetables provides protection against heart attack, stroke, cancer and other illnesses.**

Given their/your current and likely future fruit and vegetable intake, how likely do you think they/you are to have a heart attack, stroke or cancer before the age of 70?



What do you think are their/your chances of increasing their/your fruit and vegetable intake over the next six months if you decided to?




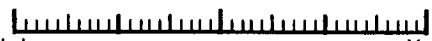
How likely do you think they/you are to have a heart attack, stroke or cancer by the age of 70 if they/you maintained your increased fruit and vegetable intake?




- **Information:** Exposure of uncovered skin to ultra-violet rays from the sun is associated with increased risk of skin cancer.

Given their/your current and likely future exposure to the sun, how likely do you think they/you are to have contracted skin cancer before the age of 70?

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


What do you believe would be their/your chances of increasing their/your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if they/you decided to?

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

How likely do you think they/you are to have contracted skin cancer by the age of 70 if they/you have used blockout (15+) and/or worn protective clothing?

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

Please note down the time from the display clock

	:	
min		sec

 then turn over.

Likelihood ratings (S & B)

For each of the following items, please use the scale to indicate the likelihood that you will experience the situation at some stage in your life.

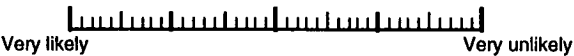
Please note down the time from the display clock

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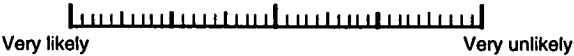
 then turn over immediately and continue.

Likelihood ratings (S & B)

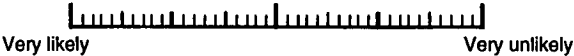
- Contracting some form of cancer.



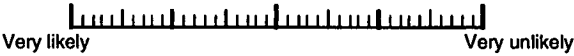
- Being a victim of fire.



- Achieving great cardiac fitness.



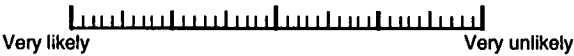
- Developing high blood pressure.



- Becoming an alcoholic.



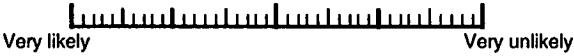
- Regularly maintaining a well balanced diet.



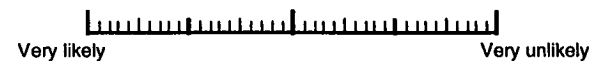
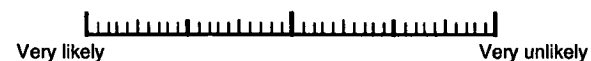
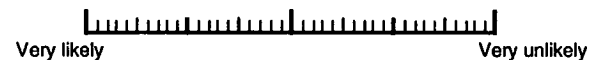
- Developing diabetes.



- Regularly maintaining an exercise program.



- Lowering cholesterol levels.
- Developing arthritis.
- Being involved in a car accident.
- Being in great physical shape.
- Having a stroke.
- Learning relaxation skills and reducing tension.
- Maintaining ideal body weight.
- Reducing exposure to toxic substances.



Please note down the time from the display clock

	:	
min		sec

then turn over.

Likelihood ratings (S & B)

For each of the following items, please use the scale to indicate, first, the likelihood that the average student your age would experience the situation in their lifetime and, second, the likelihood that you will experience the situation at some stage in your life.

Please note down the time from the display clock

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min		sec

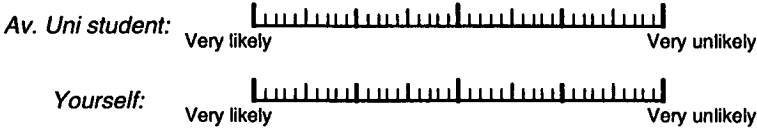
then turn over immediately and begin.

Likelihood ratings (S & B)

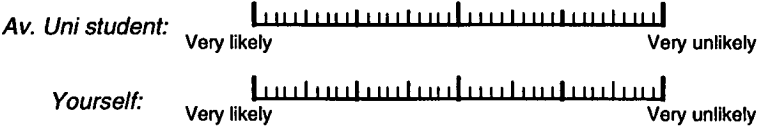
- Contracting some form of cancer.



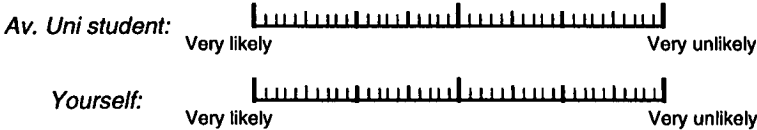
- Being a victim of fire.



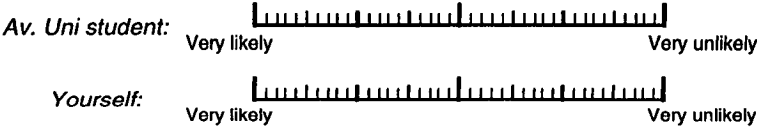
- Achieving great cardiac fitness.



- Developing high blood pressure.

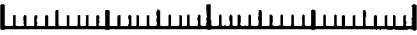



- Becoming an alcoholic.




<ul style="list-style-type: none">Regularly maintaining a well balanced diet.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>
<ul style="list-style-type: none">Developing diabetes.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>
<ul style="list-style-type: none">Regularly maintaining an exercise program.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>
<ul style="list-style-type: none">Lowering cholesterol levels.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>
<ul style="list-style-type: none">Developing arthritis.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>
<ul style="list-style-type: none">Being involved in a car accident.	<p>Av. Uni student:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div> <p>Yourself:</p> <div><div></div><div>Very likely</div><div>Very unlikely</div></div>


- Being in great physical shape.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


- Having a stroke.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


- Learning relaxation skills and reducing tension.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely


- Maintaining ideal body weight.

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

- Reducing exposure to toxic substances.

Av. Uni student:  Very likely Very unlikely

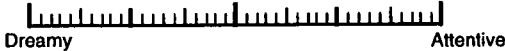
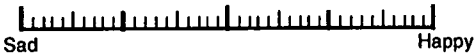
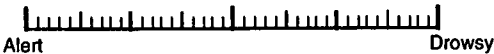
Yourself:  Very likely Very unlikely

Please note down the time from the display clock

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min		sec

then turn over.

Please read the following word pairs and mark, with a line through the scale, the position on the scale that refers to you at this moment.



Please turn over the page and continue.

Post - experimental questionnaire

Has anything affected your mood over the last few days? Yes / No (Please circle).

If yes, please indicate whether this is likely to have made you happier or sadder than usual: Happier / Sadder (Please circle).

Before discussion with the experimenter, are there any other comments you would like to make?

Please wait quietly for others to finish. Not all tasks are of equal length.

End

Thank you for your participation.

Appendix F

Protocols for Experiment 8

for Participant Consent Form – See Appendix E1

for Scripts for Autobiographical Mood Inductions – See Appendix E3

Appendix F1: Questionnaire Booklets

Notes

“Dobber” negative items were of four types, depending on the inclusion or omission of some initial words to the stem (cue in, cue out) and some closing words after the stem (age in, age out). “Dobber” positive questions, and “Salovey and Birnbaum” positive and negative items were of a single type.

For each of these seven, there were two further versions, depending on item target (‘Self’ only, ‘Self and Average’).

In summary, the available sections were:

- a. An instruction page for answering the visual analogue scales etc.
- b. An instruction page (used in Salovey & Birnbaum ‘Self’ only versions of booklet).
- c. An instruction page (used in Dobber ‘Self’ only versions of booklet).
- d. An instruction page (‘used in Salovey & Birnbaum ‘Self and Average’ versions of booklet).
- e. An instruction page (used in Dobber ‘Self and Average’ versions of booklet).

<i>‘Self’ Positive items</i>	<i>‘Self’ Negative items</i>	<i>‘Self’ & ‘Av’ Positive items</i>	<i>‘Self’ & ‘Av’ Negative items</i>
f. Salovey & Birnbaum	h. Salovey & Birnbaum	m. Salovey & Birnbaum	o. Salovey & Birnbaum
g. Dobber	i. Dobber, Cue in, Age in	n. Dobber	p. Dobber, Cue in, Age in
	j. Dobber, Cue in, Age out		q. Dobber, Cue in, Age out
	k. Dobber, Cue out, Age in		r. Dobber, Cue out, Age in
	l. Dobber, Cue out, Age out		s. Dobber, Cue out, Age out

- t. Final mood rating
- u. Post-experimental questionnaire

The questionnaire booklets were compiled from these sections in the following order:

1.	a. then	b.	then	f. then	h.	then t. then u.
2.				h. then		
3.				g. then		
4.				i. then		
5.	a. then	c.	then	g. then	j.	then t. then u.
6.				j. then		
7.				g. then		
8.				k. then		
9.	a. then	d.	then	g. then	l.	then t. then u.
10.				i. then		
11.				m. then		
12.				o. then		
13.	a. then	e.	then	n. then	p.	then t. then u.
14.				p. then		
15.				l. then		
16.				q. then		
17.	a. then			n. then	r.	then t. then u.
18.				r. then		
19.				n. then		
20.				s. then		

Note: These sections are reproduced below, (at 80% reduction) from a. to u.

A Health Ratings Experiment

You will be asked to answer a number of questions.

You are asked to do this by putting a line through a scale to indicate your rating.

For example, if you were asked to indicate your statistics ability, you would put a line through the scale at the appropriate place.

If you were quite good at statistics you might put your line as shown.

e.g. Indicate your statistics ability



You will also be asked to note down the time on the display clock at various stages during the experiment. It is important to note the time accurately.

Please give your age: (years)

Are you: Male Female (please circle)

Section a.

Instruction page for answering the visual analogue scales etc.

Likelihood ratings (S & B)

For each of the following items, please use the scale to indicate the likelihood that you will experience the situation at some stage in your life.

Health Ratings Experiment

For each of the following questions please use the scale to indicate the likelihood of your suffering from the specified illnesses and how confident you are that you could make various health-related changes.

Health Ratings Experiment

For each of the following items please use the scale to indicate, first, the likelihood that the average student your age would experience the situation in their lifetime and, second, the likelihood that you will experience the situation at some stage in your life.

Health Ratings Experiment

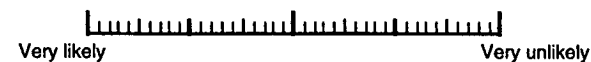
For each of the following questions please use the scale to indicate the likelihood of suffering from the specified illness and confidence in making various health-related changes, first for the average student your age, and second for yourself.

Begin here.

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min	sec

Please note down the time from the display clock and start.

- Achieving great cardiac fitness.



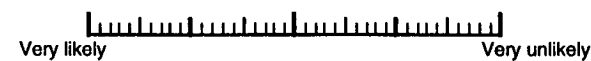
- Regularly maintaining a well balanced diet.



- Regularly maintaining an exercise program.



- Lowering cholesterol levels.



- Being in great physical shape.



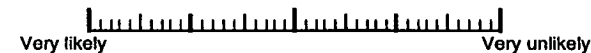
- Learning relaxation skills and reducing tension.



- Maintaining ideal body weight.



- Reducing exposure to toxic substances.



Please note down the time from the display clock then turn over.

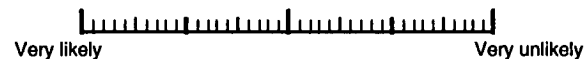
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Begin here.

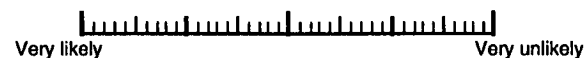
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<u> </u> min <u> </u> sec

Please note down the time from the display clock and start.

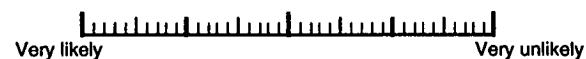
What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?



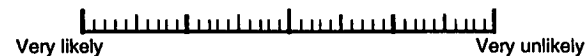
What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?



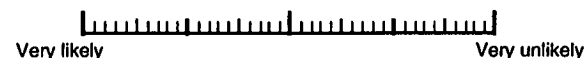
What do you believe would be your chances of reducing your intake of salt/salty foods over the next six months if you decided to?



What do you believe would be your chances of improving your intake of milk and dairy products over the next six months if you decided to?



What do you believe would be your chances of increasing the amount of fibre in your diet over the next six months if you decided to?



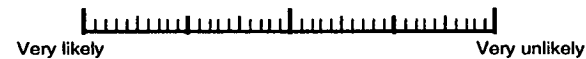
What do you believe would be your chances of improving your level of dental care over the next six months if you decided to?



What do you believe would be your chances of protecting your eyes from exposure to high levels of sunlight over the next summer if you decided to?



What do you believe would be your chances of reducing your exposure to loud music/high sound levels over the next six months if you decided to?



Please note down the time from the display clock then turn over.

:
<u> </u> min <u> </u> sec

Begin here.

:

min

sec

Please note down the time from the display clock and start.

• Contracting some form of cancer.

Very likely

Very unlikely

• Being a victim of fire.

Very likely

Very unlikely

• Developing high blood pressure.

Very likely

Very unlikely

• Becoming an alcoholic.

Very likely

Very unlikely

• Developing diabetes.

Very likely

Very unlikely

• Developing arthritis.

Very likely

Very unlikely

• Being involved in a car accident.

Very likely

Very unlikely

• Having a stroke.

Very likely

Very unlikely

Please note down the time from the display clock then turn over.

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min

sec

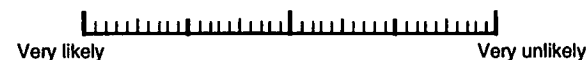
361

Begin here.

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min sec

Please note down the time from the display clock and start.

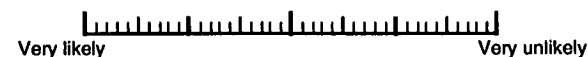
Given your current and likely future exercise level, how likely do you think you are to develop cardiovascular disease (heart attack or stroke) before the age of 70?



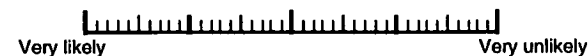
Given your current and likely future exposure to the sun, how likely do you think you are to contract skin cancer before the age of 70?



Given your current and likely future use of salt/salty foods, how likely do you think you are to develop high blood pressure before the age of 70?



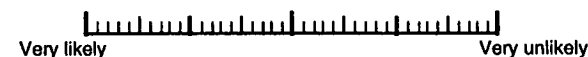
Given your current and likely future intake of milk and dairy products, how likely do you think you are to develop osteoporosis before the age of 70?



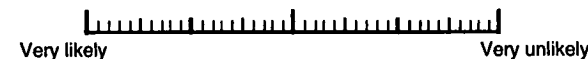
Given your current and likely future fibre diet, how likely do you think you are to develop bowel disease before the age of 70?



Given your current and future likely level of dental care, how likely do you think you are to develop serious tooth or gum problems before the age of 70?



Given your current and future likely exposure to high levels of sunlight, how likely do you think you are to develop cataracts before the age of 70?



Given your current and future likely exposure to loud music/high sound levels, how likely do you think you are to develop deafness before the age of 70?



Please note down the time from the display clock then turn over.

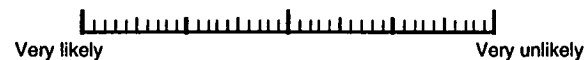
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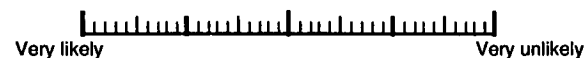
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Please note down the time from the display clock and start.

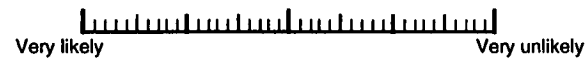
Given your current and likely future exercise level, how likely do you think you are to develop cardiovascular disease (heart attack or stroke)?



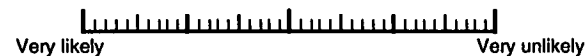
Given your current and likely future exposure to the sun, how likely do you think you are to contract skin cancer?



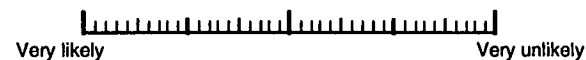
Given your current and likely future use of salt/salty foods, how likely do you think you are to develop high blood pressure?



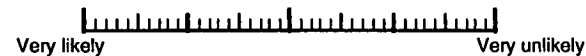
Given your current and likely future intake of milk and dairy products, how likely do you think you are to develop osteoporosis?



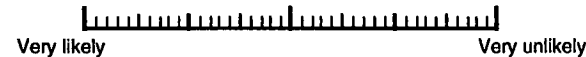
Given your current and likely future fibre diet, how likely do you think you are to develop bowel disease?



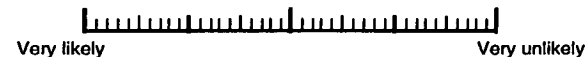
Given your current and future likely level of dental care, how likely do you think you are to develop serious tooth or gum problems?



Given your current and future likely exposure to high levels of sunlight, how likely do you think you are to develop cataracts?



Given your current and future likely exposure to loud music/high sound levels, how likely do you think you are to develop deafness?



Please note down the time from the display clock then turn over.

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Begin here.

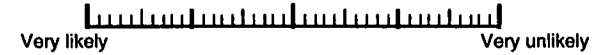
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Please note down the time from the display clock and start.

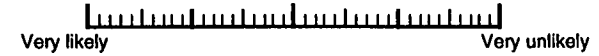
How likely do you think you are to develop cardiovascular disease (heart attack or stroke) before the age of 70?



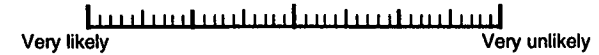
How likely do you think you are to contract skin cancer before the age of 70?



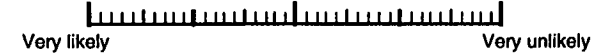
How likely do you think you are to develop high blood pressure before the age of 70?



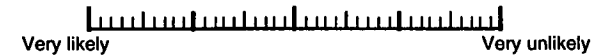
How likely do you think you are to develop osteoporosis before the age of 70?



How likely do you think you are to develop bowel disease before the age of 70?



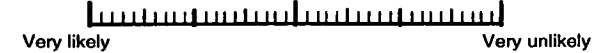
How likely do you think you are to develop serious tooth or gum problems before the age of 70?



How likely do you think you are to develop eye cataracts before the age of 70?



How likely do you think you are to develop deafness before the age of 70?



Please note down the time from the display clock then turn over.

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Begin here.

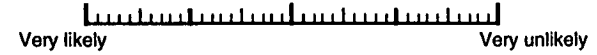
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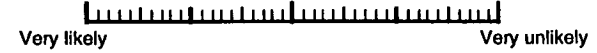
sec

Please note down the time from the display clock and start.

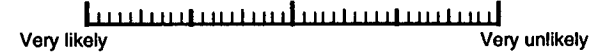
How likely do you think you are to develop cardiovascular disease (heart attack or stroke)?



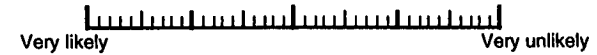
How likely do you think you are to contract skin cancer?



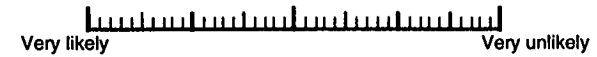
How likely do you think you are to develop high blood pressure?



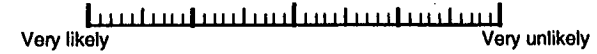
How likely do you think you are to develop osteoporosis?



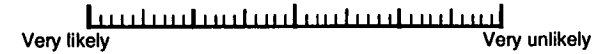
How likely do you think you are to develop bowel disease?



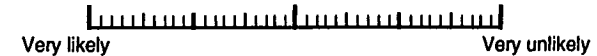
How likely do you think you are to develop serious tooth or gum problems?



How likely do you think you are to develop cataracts?



How likely do you think you are to develop deafness?



Please note down the time from the display clock then turn over.

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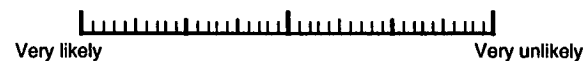
Please note down the time from the display clock and start.

- Achieving great cardiac fitness.

Av. Uni student:

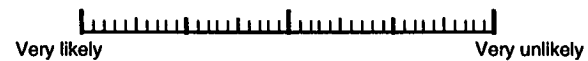


Yourself:

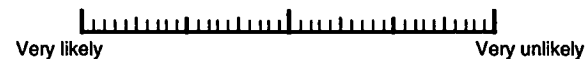


- Regularly maintaining a well balanced diet.

Av. Uni student:

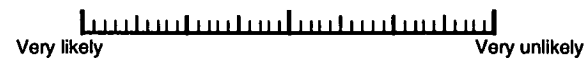


Yourself:



- Regularly maintaining an exercise program.

Av. Uni student:

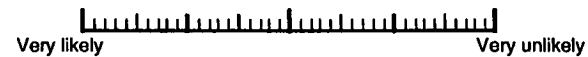


Yourself:

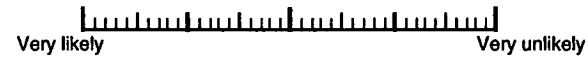


- Lowering cholesterol levels.

Av. Uni student:

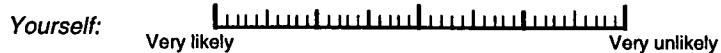
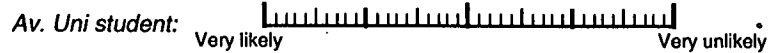


Yourself:

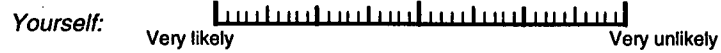
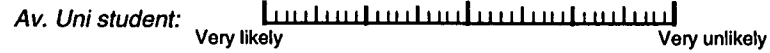


Please turn over and continue.

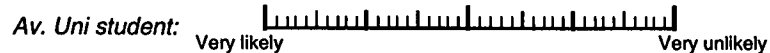
- Being in great physical shape.



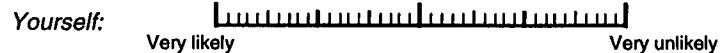
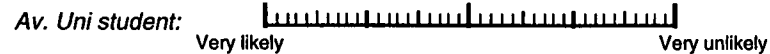
- Learning relaxation skills and reducing tension.



- Maintaining ideal body weight.



- Reducing exposure to toxic substances.



Please note down the time from the display clock then turn over.

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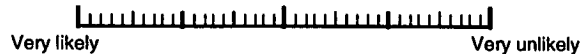
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Please note down the time from the display clock and start.

What do you believe would be your chances of sticking to a regular exercise program over the next six months if you decided to?

Av. Uni student:

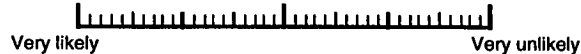


Yourself:

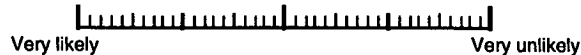


What do you believe would be your chances of increasing your use of blockout (15+) and/or wearing sun-protective clothing over the next summer if you decided to?

Av. Uni student:

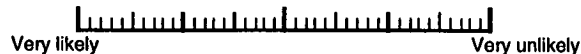


Yourself:



What do you believe would be your chances of reducing your intake of salt/salty foods over the next six months if you decided to?

Av. Uni student:

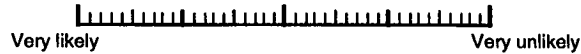


Yourself:

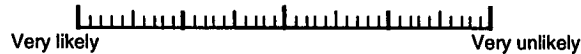


What do you believe would be your chances of improving your intake of milk and dairy products over the next six months if you decided to?

Av. Uni student:



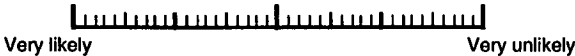
Yourself:



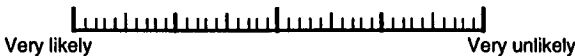
Please turn over and continue.

What do you believe would be your chances of increasing the amount of fibre in your diet over the next six months if you decided to?

Av. Uni student:

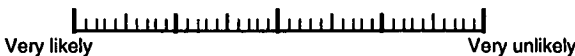


Yourself:

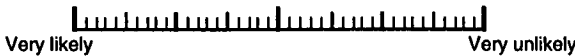


What do you believe would be your chances of improving your level of dental care over the next six months if you decided to?

Av. Uni student:

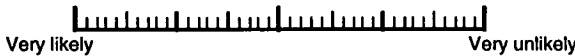


Yourself:

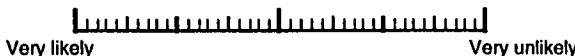


What do you believe would be your chances of protecting your eyes from exposure to high levels of sunlight over the next summer if you decided to?

Av. Uni student:

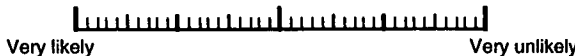


Yourself:



What do you believe would be your chances of reducing your exposure to loud music/high sound levels over the next six months if you decided to?

Av. Uni student:



Yourself:



Please note down the time from the display clock then turn over.

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 Very unlikely

- Developing diabetes.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely

- Developing arthritis.

Av. Uni student:  Very likely Very unlikely


Yourself:  Very likely Very unlikely

- Being involved in a car accident.

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

- Having a stroke.

Av. Uni student:  Very likely Very unlikely

Yourself:  Very likely Very unlikely

Please note down the time from the display clock then turn over.

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Begin here.

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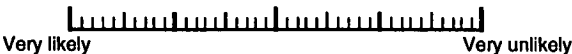
min

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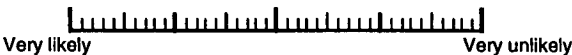
Please note down the time from the display clock and start.

Given your current and likely future exercise level, how likely do you think you are to develop cardiovascular disease (heart attack or stroke) before the age of 70?

Av. Uni student:

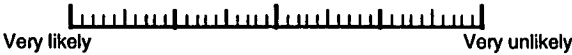


Yourself:



Given your current and likely future exposure to the sun, how likely do you think you are to contract skin cancer before the age of 70?

Av. Uni student:

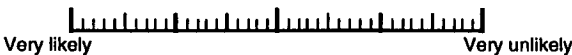


Yourself:

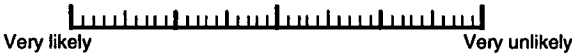


Given your current and likely future use of salt/salty foods, how likely do you think you are to develop high blood pressure before the age of 70?

Av. Uni student:



Yourself:

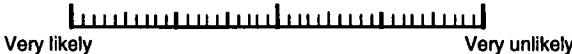


Given your current and likely future intake of milk and dairy products, how likely do you think you are to develop osteoporosis before the age of 70?

Av. Uni student:



Yourself:



Please turn over and continue.

Given your current and likely future fibre diet, how likely do you think you are to develop bowel disease before the age of 70?



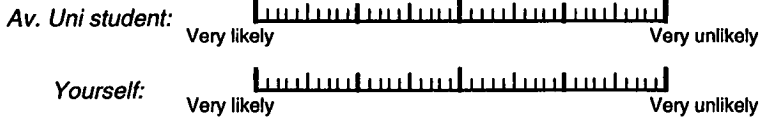
Given your current and future likely level of dental care, how likely do you think you are to develop serious tooth or gum problems before the age of 70?



Given your current and future likely exposure to high levels of sunlight, how likely do you think you are to develop cataracts before the age of 70?



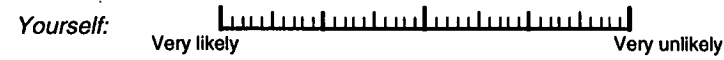
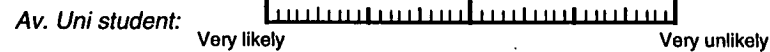
Given your current and future likely exposure to loud music/high sound levels, how likely do you think you are to develop deafness before the age of 70?



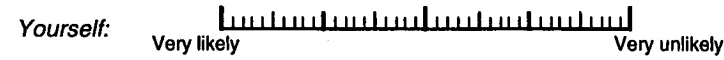
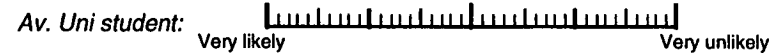
Please note down the time from the display clock then turn over.

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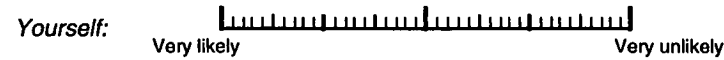
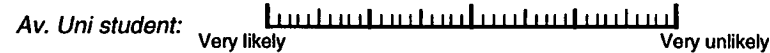
Given your current and likely future fibre diet, how likely do you think you are to develop bowel disease?



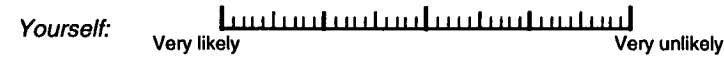
Given your current and future likely level of dental care, how likely do you think you are to develop serious tooth or gum problems?



Given your current and future likely exposure to high levels of sunlight, how likely do you think you are to develop cataracts?



Given your current and future likely exposure to loud music/high sound levels, how likely do you think you are to develop deafness?



Please note down the time from the display clock then turn over.

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Given your current and likely future fibre diet, how likely do you think you are to develop bowel disease?

Av. Uni student:

Av. Uni student:

Av. Uni student:

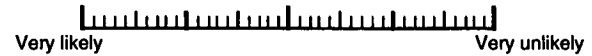
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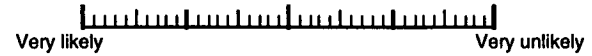
Section r.

Dobber items, negative items, 'Self' and 'Average' (cue out, age in)
(first page)

Av. Uni student:



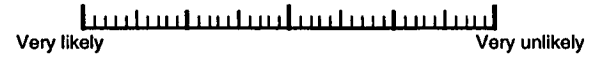
Av. Uni student:



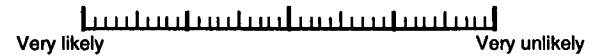
Very likely

 Very unlikely

Av. Uni student:



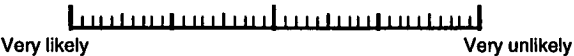
Av. Uni student:



(first page)

How likely do you think you are to develop bowel disease before the age of 70?

Av. Uni student:

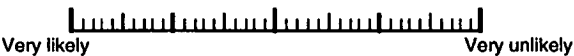


Yourself:

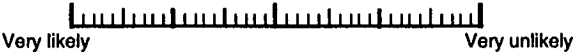


How likely do you think you are to develop serious tooth or gum problems before the age of 70?

Av. Uni student:

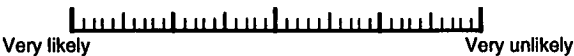


Yourself:

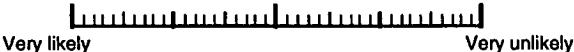


How likely do you think you are to develop eye cataracts before the age of 70?

Av. Uni student:

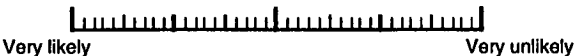


Yourself:

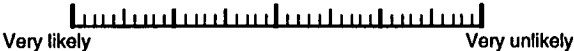


How likely do you think you are to develop deafness before the age of 70?

Av. Uni student:



Yourself:



Please note down the time from the display clock then turn over.

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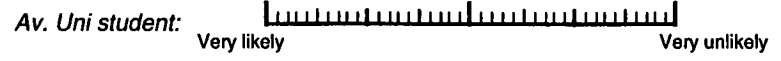
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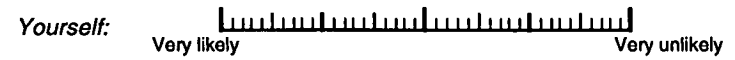
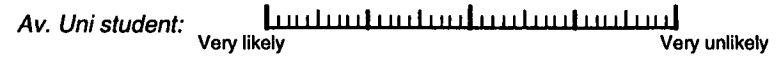
<p>How likely do you think you are to develop cardiovascular disease (heart attack or stroke)?</p>	<p>Av. Uni student:  Very likely Very unlikely</p> <p>Yourself:  Very likely Very unlikely</p>
<p>How likely do you think you are to contract skin cancer?</p>	<p>Av. Uni student:  Very likely Very unlikely</p> <p>Yourself:  Very likely Very unlikely</p>
<p>How likely do you think you are to develop high blood pressure?</p>	<p>Av. Uni student:  Very likely Very unlikely</p> <p>Yourself:  Very likely Very unlikely</p>
<p>How likely do you think you are to develop osteoporosis?</p>	<p>Av. Uni student:  Very likely Very unlikely</p> <p>Yourself:  Very likely Very unlikely</p>

Please turn over and continue.

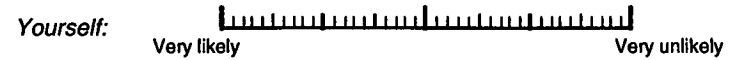
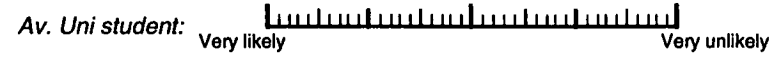
How likely do you think you are to develop bowel disease?



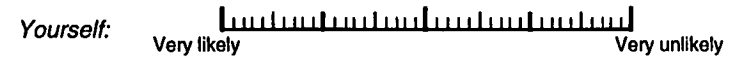
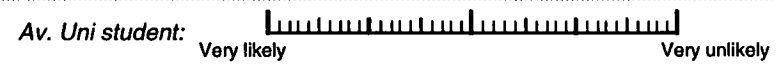
How likely do you think you are to develop serious tooth or gum problems?



How likely do you think you are to develop cataracts?



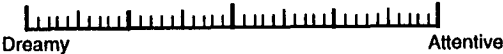
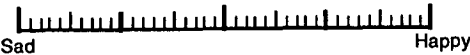
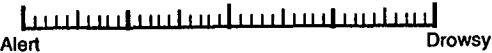
How likely do you think you are to develop deafness?



Please note down the time from the display clock then turn over.

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Please read the following word pairs and mark, with a line through the scale, the position on the scale that refers to you at this moment.



Please turn over the page and continue.

Post - experimental questionnaire

Please write a few lines about the thoughts you were having about your own health when you were answering the questions about health issues.
(Refer back to the relevant pages if you wish, but do not change your ratings.)

First set of ratings _____

Second set of ratings _____

Are there any other comments you would like to make? _____

Please wait quietly for others to finish. Not all tasks are of equal length.

End

Thank you for your participation.